



Air Resources Board



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Arnold Schwarzenegger
Governor

November 16, 2005

To: All Phase I and II Enhanced Vapor Recovery (EVR) Stakeholders

On August 10, 2005, the California Air Resources Board (ARB) posted a letter on the ARB Vapor Recovery Program web site (<http://www.arb.ca.gov/vapor/vapor.htm>) soliciting stakeholder comments on a proposed challenge mode protocol for balance type vapor recovery systems undergoing enhanced vapor recovery (EVR) certification. Written comments were requested by August 30, 2005.

ARB received over 100 comments from a total of 12 stakeholder groups including members of the CAPCOA Vapor Recovery Committee, local Air Pollution Control Districts, equipment manufacturers, trade groups, and industry consultants.

Enclosed is our response to the comments received. Because many stakeholders had similar comments, our responses are divided into topic categories and some comments were combined. In addition, also enclosed is a revised balance system challenge mode protocol that reflects changes to the protocol based on stakeholder comments.

On behalf of the ARB, We appreciate the time and effort of all of those who provided comments. We intend to use the enclosed challenge mode protocol beginning this winter to move forward with certification of Phase II EVR balance-type vapor recovery systems.

If you have questions or need further information, please contact Lou Dinkler at (916) 322-8949 or via email at ldinkler@arb.ca.gov or Pat Bennett at (916) 322-8959 or via email at pbennett@arb.ca.gov.

Sincerely,

George Lew, Chief
Engineering and Certification Branch
Monitoring and Laboratory Division

Enclosure

The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our Website: <http://www.arb.ca.gov>.

California Environmental Protection Agency

Stakeholder Comments and ARB Responses Regarding the Proposed Balance System Challenge Mode Protocol dated August 10, 2005

Comment letters, faxes, and e-mails received from (in alphabetical order):

1. ARID Technologies (ARID)
2. Bay Area Air Quality Management District (BAAQMD)
3. California Air Pollution Control Officers Association -Vapor Recovery Committee (CAPCOA)
4. Franklin Fueling Systems
5. Goodyear
6. Healy Systems (Healy)
7. Husky Corporation (Husky)
8. OPW Fueling Components (OPW)
9. Remote Sensing Air, Inc. (RSA)
10. San Luis Obispo Air Pollution Control District (SLOAPCD)
11. Vapor System Technology (VST)
12. Western States Petroleum Association (WSPA)

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- T. Lock Out of Nozzles
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- AA. Timing of Challenge Mode in Relation to Operational Test Period
- BB. Ullage / 50% minimum Ullage
- CC. Vapor Processor
- DD. Other

A. ARB Involvement (CAPCOA, OPW, Franklin Fueling Systems):

1. **Comment:** Will it be ARB or the individuals submitting the application that are to conduct this test? In order to maintain continuity between tests, OPW suggests the test be conducted by ARB and witnessed by the applicant.

Response: ARB will be responsible for selecting and obtaining the test sites, testing, continuous pressure monitoring system (data acquisition system), and data collection. The applicant is responsible for obtaining the permits, making arrangements with the owner operator, installing equipment, and any required maintenance/repairs. ARB staff will inform the applicant when testing will be conducted so that they will have an opportunity to witness.

2. **Comment:** Will ARB be looking for or expecting assistance from the “host” air district? In other words, who will be conducting these tests?

Response: ARB will gladly accept assistance from the host district especially in expeditious processing of permits. However it is not expected or required. As stated above, ARB will conduct the testing.

B. Availability of EVR Equipment (ARID, Husky, CAPCOA)

3. **Comment:** What nozzles are presently commercially available for Phase II EVR Balance?

Response: At this time, there are no commercially available Phase II EVR certified balance nozzles. In the near future, we anticipate applications for certification from a number of balance nozzle manufacturers.

4. **Comment:** Currently a balance system is NOT Phase II EVR compliant. Is ARB also considering using this site to test a balance Phase II EVR system?

Response: The sites in southern California will be used only for the challenge tests. The applicant will need to acquire sites within a 100-mile radius of Sacramento for certification testing.

C. Availability of Sites with 9 Hour Shut Down (BAAQMD, Goodyear, VST, OPW)

5. **Comment:** Under Test Conditions you require a daily station shutdown of at least 9 hours. We have concerns that this length of station shutdown may not represent the shutdowns experienced by most balance stations. Does your station data suggest that 9 hours is an appropriate shutdown time for challenge mode or would it be more reasonable to conduct challenge mode testing at some shorter time period such as 4-6 hours?

Response: ARB is aware of approximately 134 sites in California that shut down for at least 9 hours a night. Examples include Costco and Sam's Club fueling facilities. We agree that many more stations are shutdown for less than 9 hours, or open 24 hours but may go several hours without vehicle fueling occurring. If the balance system without a processor complies with the pressure profile with at least 9 hour shut down, one could reasonably assume that sites that shut down for fewer hours (4-6 hours) will also be deemed compatible.

6. **Comment:** Is it the requirement of the manufacturers to identify sites that meet this profile (in Southern California, 150,000 gal/month with daily shutdown of at least 9 hours)?

Response: No, see response to comment 1.

7. **Comment:** Will ARB please indicate the percentage of GDFs these hours of operation represents? Is this worst-case? Has ARB taken into consideration how difficult it may be to find a participant willing to shutdown their GDF for 9 hours daily over a 30-day period?

Response: According to our information, approximately 1.2 % of the GDF population in California use these operating hours. ARB is not aware whether these facilities represent a "worst case" condition because there are most likely other variables that would need to be considered to make this determination. For GDFs that close at night, a period of 9 hours is considered to be "typical." ARB has acquired permission to use two GDFs in southern California for these challenge mode tests.

D. "Bad Delivery" Simulation (WSPA, CAPCOA, OPW, Husky, RSA, BAAQMD):

8. **Comment:** Please clarify what is meant by the statement "Fuel delivery at closing and vent station to simulate bad delivery (may be conducted more frequently)": i.e. how exactly is a "bad delivery" simulated: and do all fuel deliveries need to be simulated as "bad" at the closing of a week's worth of business, or just one? In general, WSPA does not agree with this concept because failure of a system with intentional misuse should not be used as a basis for failure of certification testing. It also appears to treat balance systems unfairly; for example, if requirements such as those placed on balance systems, then vac-assist systems should also have to address failure modes (such as loss of electrical power).

Response: Due to the significant number of comments received on this issue, and the fact that certain non-compliant deliveries cannot be included in the calculation of daily and 30-day rolling pressure averages, this will be removed from the challenge mode protocol.

9. **Comment:** In our experience a bad delivery typically leaves the UST vapor space pressure at the PV vent valve's positive opening pressure of +3.0" wc. Does this test suggest performing a fuel delivery and not connecting the stage 1 vapor return hose forcing a venting episode at +3"wc and leave the UST pressure at +3"wc after the delivery? OPW would be concerned about emissions to the atmosphere in doing this. Added by performing this test you will add high-pressure data that would be included in the site's pressure profile. How would this data be viewed in terms of the required passing criteria? OPW suggest that ARB consider the simulation of the isolated event of a bad delivery be removed from the test procedure.

Response: See response to Comment 8.

10. **Comment:** I am not quite sure that I understand the weekly fuel delivery requirement. Will there be actual bad deliveries with no vapor hose connected in order to create actual pressures of a bad delivery, OR will the system simply be vented after a regular delivery? I would think that the former would give you the worst case scenario and be more accurate for what happens during a really bad delivery that produces pressure. Of course there are a number of different types of bad fuel drops – the vapor hose not connected produces the highest pressures, problems with the cargo tanker valves can also produce high pressures, holes in the vapor hoses can leave the system open and release all pressure/vacuum, and the vapor hose can be connected while a diesel drop is made causing major vacuum.

I think that once a week is more than sufficient to evaluate the impact of bad fuel deliveries on the emissions. You also need data where there are good fuel deliveries at the end of the day since these are more likely. If it would be helpful for you, we can provide an average percentage of bad drops (from data collected during various types of tests at balance systems both closed over night and open overnight) as well as a frequency plot of times of day for fuel deliveries.

Response: See response to Comment 8.

11. **Comment:** Under Test Procedures (Weekly) you specify fuel delivery at closing and vent station to simulate bad delivery with an option to conduct this more frequently. We were not quite sure what your protocol meant in terms of simulating a bad delivery. If you plan to make the fuel drop without the vapor connection or by restricting the vapors back to the delivery truck so as to blow vapors out the p/v valve vents we suggest that you proceed with caution and do it safely! (e.g., gasoline vapors do travel and can be ignited by unsuspecting downwind smokers)

Response: See response to Comment 8.

12. **Comment:** Although section 4.6 of CP-201 is cited, please clarify that “the pressure data will be evaluated so that periods during which system pressure changes directly attributable to Phase I equipment or operations that do not comply with section 4.1.2 and/or 4.1.3 of CP-204 are not used to determine failure of the Phase II system to meet the system pressure criteria” (as per CP-201, Section 4.6.1) and that the pressure criteria will be evaluated in accordance with Sections 4.6.2 through 4.6.6 and that this protocol is not proposing “other methods of data collection and analysis” as referred to by Section 4.6.6.

Response: See response to Comment 8. The pressure data will be collected using TP-201.7.

E. Compliance Testing (CAPCOA, ARID, Husky, VST, WSPA)

13. **Comment:** Why are the Phase I EVR tests (e.g. TP-201.1B, TP-201.1C or TP-201.1D, and TP-201.1E) not going to be performed?

Response: ARB staff does not conduct Phase I tests as part of a Phase II certification evaluation. If a pressure decay test fails during the challenge test, ARB staff may need to conduct TP-201.1C and/or TP-201.1D as part of the troubleshooting process. TP-201.1B testing is not necessary and the pressure decay test should show any leak(s) in the vapor adaptor. ARB staff will bench test two Husky pressure vacuum (P/V) vent valves per TP-201.1E and install at the sites in southern California prior to challenge start-up tests.

14. **Comment:** Is the TP-201.4 test to be performed on a daily, weekly or bi-weekly basis?

Response: Assuming at least a 30 day challenge test, TP-201.4 will be conducted upon start up and at the end. If significantly longer than 30 days, TP-201.4 will be conducted monthly to ensure ongoing compliance.

15. **Comment:** If the GDF is due to have its required reverification vapor recovery tests during this test period, would the installation of this test equipment alter or have an affect on the station’s test results? In other words, can the GDF perform its required reverification tests during this test period?

Response: Reverification tests will be conducted during the challenge mode tests.

16. **Comment:** Weekly, perhaps include A/L data for each fueling point

Response: A/L testing is not applicable to balance systems.

17. **Comment:** It should be determined that all tests have been passed before the start of the 30 days.

Response: Challenge mode testing will not begin unless the system passed the proposed start-up tests.

18. **Comment:** System integrity test per TP-201.3 should be conducted weekly.

Comment: What is the rationale for only performing this test once during the actual test period (there will be only 1 bi-weekly test during a 30 day test period)?

Response: Due to an interruption to the pressure profile, a weekly leak decay is too frequent. An extra day of monitoring is needed to eliminate the variable introduced by each leak decay test at night. ARB staff will download and evaluate the pressure data twice a week to look for indications of leaks.

19. **Comment:** Both the pre-test procedures, test procedures, and post-test procedures require TP-201.3 pressure-decay leak testing, which involves injecting nitrogen into the UST and observing the pressure decay. WSPA requests that if pressures are reasonably positive (1.0-1.5 inches water column) during station downtime that the leakiness instead be assessed by observing the pressure decay of the system during that time period without adding nitrogen. Given that TP-201.3 test results can be somewhat variable and that allowable pressure decays can also be very low when UST ullage is high, we recommend that TP-201.3 testing be conducted early in the morning (i.e. when temperatures are varying very little) and that tests be conducted in triplicate during the GDF downtime (to confirm the accuracy of the result). If nitrogen is used, we recommend that nitrogen flow rate be minimized to reduce the potential for vapor growth (i.e., given that the method currently allows flow rates of 1-5 cfm, we would prefer to see flow rates closer to 1 cfm).

Response: ARB will conduct leak decay testing in accordance with TP-201.3. To minimize temperature variations, ARB will test the site after closing hours (after 9:00 pm). Regarding nitrogen flow into the system, ARB staff typically introduce nitrogen at the lowest rate of 1 cfm or 60 cfh.

F. Conclusion / Findings (WSPA, Franklin Fueling Systems, VST)

20. **Comment:** Assuming the station under test passes the protocol as defined by the pass/fail criteria, what logical conclusions result from the test results?

Response: If the challenge mode demonstrates that a balance system can meet the pressure profile criteria with at least nine hours when there is no refueling and when using winter fuel as specified in the protocol, ARB will conclude that the system may proceed with certification testing without a processor. However,

the actual certification test will ultimately determine whether a pressure management system is needed. Such findings will be listed in the certification summary. However, the actual certification test will ultimately determine whether the pressure management system is required.

21. **Comment:** Will this test be equipment specific? In other words, if the test passes after 30-days, will the results only be valid for the equipment installed?

Response: Yes to both questions.

22. **Comment:** Will this new requirement apply to all ORVR compatible systems, Balance, ORVR assist, Healy, Balance with a processor, etc. Will a full system need to be installed in Southern Ca?

Response: This challenge mode test is specific to balance systems without processors. An assist system with processor may require a different challenge mode test as warranted by the system design. The installation of EVR balance hanging hardware will suffice for the challenge mode test site.

G. Cost (Franklin Fueling Systems, VST, OPW)

23. **Comment:** It will be nearly impossible to find a customer that will agree to these terms unless it comes from BP, Chevron, or Conoco/Phillips. The demands are very strict and will cost us a lot of money. I think we should be able to enter a certification without a processor before the completion of the test, or even the start of the test. We have already proved one site per their request and this should be enough to begin.

Response: ARB has secured approval to conduct these tests at two sites in southern California which do not dispense gasoline for at least 9 hours. These sites meet the challenge mode criteria. Applicants can initiate a certification at any time before, during, or following the challenge mode test.

24. **Comment:** Has CARB considered the cost aspect, as it will be extremely expensive if a full system has to be installed?

Response: As stated above, only EVR balance hanging hardware needs to be installed.

25. **Comment:** To conduct a balance test an applicant would then need a 1. primary test site in Sacramento, a 2. backup site in Sacramento, and a 3. additional test site in Southern CA. Identifying, equipping, and performing tests are too costly. Recommend that all testing be performed at the operational test facility and the timing included in the minimum 180 day testing requirements. Added the results

of testing from a different site may not have direct application to the original test site.

Response: ARB will minimize costs to the system manufacturer by securing the sites in southern California and conducting challenge mode tests at no charge to the applicant. The applicant will be responsible for installing equipment, providing contractor support at the site and obtaining necessary district permits.

H. Daily Tasks (OPW, ARID , VST)

26. **Comment:** OPW recommends that a printout is generated at the beginning and end of each of the shutdown intervals.

Response: The proposal currently requires a daily printout at shutdown. A morning print out will be included to verify that no fueling occurred during the night and to document the daily throughput of the site.

27. **Comment:** Please add the following daily requirements;
- an ISD report of the vapor space leak detection value and a defined pass/fail criterion be set as part of this protocol.
- if a site's pressure remains at atmospheric (0.0" wc) for one entire shutdown period a test be performed the following day to ensure the site is vapor tight and/or the data collection equipment is functioning properly.

Response: ISD is not available at the challenge site locations. The protocol has been amended to investigate pressure integrity if the UST pressure remains at 0.0 in wc during the shutdown period. Ullage pressure data will be downloaded and evaluated two times per week throughout the challenge tests.

28. **Comment:** Daily, perhaps make use of a portable HC "sniffer" to ensure nozzle boots are properly seating and not allowing escape of vapors to the atmosphere.

Response: No change made. There is an allowable leak rate for the nozzles. The station operator will be trained to ensure that nozzles are properly hung in the dispenser cradle prior to locking out the nozzles during closing.

29. **Comment:** Daily, perhaps use HC sniffer to monitor the spill buckets for fugitive leaks.

Response: No change made. There is an allowable leak rate for the drain valves. The leak rate test of the drop tube/drain valve assembly will be conducted at the start of the challenge mode test. The TP-201.3 testing should identify any leaks in the vapor spill bucket.

30. **Comment:** Daily product and ullage volumes from ATG – Data should be obtained after the test station is shut down and the system is tight.

Response: Agree, this is already listed in the protocol under daily tasks.

I. Data Acquisition System (Husky, RSA, SLOAPCD)

31. **Comment:** Barometric pressure should have a resolution of 0.01 wc the same as the system pressure.

Response: The data acquisition installed by ARB will be in compliance with TP-201.7, Continuous Pressure Monitoring. TP-201.7 specifies a Vaisala barometric pressure transmitter, Model PTB101B (or equivalent), which has a resolution of 0.1 hPA or approximately 0.03 inches of water column. TP-201.7 is available on the ARB vapor recovery web site at www.arb.ca.gov/vapor/vapor.htm.

32. **Comment:** What are the specifications for the continuous monitoring equipment?

Response: The data acquisition installed by ARB will be in compliance with TP-201.7, Continuous Pressure Monitoring. TP-201.7 is available on the ARB vapor recovery web site at www.arb.ca.gov/vapor/vapor.htm.

33. **Comment:** Do you have a procedure you can reference for verification of the data acquisition system?

Response: The data acquisition installed by ARB will be in compliance with TP-201.7. ARB conducts a 15 point accuracy check on the pressure transmitter using a secondary NIST traceable pressure standard instrument. This is conducted prior to installation of the data acquisition system. The data acquisition system will be rechecked at the conclusion of the challenge tests. Spot checks of the pressure transmitter will also be conducted during the leak decay portion of the challenge test.

J. District involvement (CAPCOA)

34. **Comment:** Would the “host” air district be required to issue a new permit to assure that bullet 7 and 8 under “Test Conditions” are met and will this facility be considered as an “R & D” type facility? If so, who will be responsible for submitting the application?

Response: The minimum ullage specification is removed from the “Test Conditions”. The “Host” air district is not required to list the “nozzle lock-out” as a permit condition. The applicant will need to request approval to install uncertified equipment from ARB and then contact the host air district for appropriate permitting. The facility will be designated a “R&D test site” since ARB will conduct the testing and monitoring. The applicant will be required to submit the application to the host air district in order to amend the Permit to Operate and be responsible for permit fees.

K. Downloading of data (Husky)

35. **Comment:** It is better to download data daily so that unusual events can be addressed when they happen, not a week later.

Response: Due to resource constraints, ARB staff will download pressure data two times per week.

L. Drive Offs (Franklin Fueling Systems)

36. **Comment:** How will drive-offs be handled?

Response: Hanging hardware from a drive-off will be replaced by the maintenance contractor. ARB staff will be notified prior to any maintenance activities being conducted at the challenge mode test sites. ARB will evaluate the pressure profile when such events occur and will make a determination if any impact on the pressure profile has occurred. Each occurrence will be handled on a “case by case” basis. It is possible that such events could bias the pressure profile and thereby require additional time for the challenge mode to capture 30 days of valid pressure data.

M. Duration of Challenge Mode - 30 days (OPW, Goodyear, RSA, VST, CAPCOA)

37. **Comment:** In order to eliminate issues of interpretation as to what represents a valid reason for a shorter test, the test period should be clearly defined as 30 days without exception.

Comment: 30-day test periods will be standard for all applicants. 30-day test provides far better statistical data than shorter periods thereby increasing a higher level of confidence in the results.

Response: The protocol has been revised to require a minimum of 30 days of valid UST pressure data to calculate the rolling average and daily high. Days during which leak decay is conducted after hours shall be excluded and additional day added for each test. The protocol has been amended to reflect this requirement.

38. **Comment:** If there are proposed systems that miss the window for winter fuel will they be delayed significantly?

Response: Ideally, the challenge mode test would occur prior to the primary operational test. However, if the winter fuel window has passed, then the primary certification test may begin first, with the challenge mode conducted when winter fuel is available.

39. **Comment:** Is 30 days the maximum time frame, or can it be longer if issues arise during the test that we would want a longer time to test?

Comment: As this is a 30 day average, but only a 30 day (maybe shorter) test period, you will need to include data from days outside the test period. Therefore, you should analyze the trend of 30 day averages for the station to see if something is happening during the test period (such as rising average pressures) that would indicate a longer test period is needed.

Response: 30 days will be the minimum test period. Due to unforeseen circumstances, such as drive offs or system leaks, additional time will be allowed to capture at least 30 days of valid UST pressure data.

N. Efficiency of Balance System (Healy, WSPA, CAPCOA)

40. **Comment:** The overall efficiency of a balance system is substantially less than assist systems when fueling gas cans, motorcycles, boats, etc. if the bellows is held back. In this scenario with balance almost 100% of vapor is lost and the UST ullage pressure is open to atmosphere whereas an assist nozzle, due to vacuum, would be able to draw some of the vapors and air back to the UST, and the UST ullage is not open to atmosphere. This would result in no growth in UST pressure with balance but would show growth with assist therefore requiring a back end control system. We feel that balance nozzles should have a positive seal vapor valve as do assist nozzles. Vapor valve does not open until product is dispensed.

Response: Phase II vapor recovery systems are not required to demonstrate collection efficiency with gas cans, motorcycles, boats, etc. Nozzle efficiency is evaluated in accordance with TP-201.2 consisting of a 200 car vehicle matrix based on California Department of Motor Vehicle data as determined by TP-201.2A. Nozzle efficiency will be demonstrated during the operational test period.

41. **Comment:** The requirement that pressure related fugitives be less than 0.19 pounds/1,000 gallons appears to originate from Section 4.6 of CP-201, which requires that fugitive emissions not “exceed fifty percent (50%) of the maximum allowable emission factor”. However, section 4.1.1 of CP-201 specifies that when testing with winter fuel, the maximum allowable emission factor is 0.38 pounds/1,000 gallons OR 95% efficiency (whereas when testing with summer fuel, both requirements must be met): it is expected that uncontrolled emissions may be higher than 7.6 pounds/1,000 gallons (a value determined when using low-RVP summertime gasoline) when high RVP wintertime gasoline is being used. If the Section 4.6 criteria for fugitive emissions is being applied to

challenge testing, full TP-201.2 testing will be needed in order to determine the VRS efficiency with wintertime fuel.

Response: Pressure-related fugitives will not be evaluated for this challenge mode test. The challenge mode test is for the pressure profile requirements only. The pressure-related fugitives will be calculated as part of the certification efficiency test.

42. **Comment:** Shouldn't ARB also be concerned about the way the nozzles are hung (see item 3 in Daily section) and gaps that are formed due to a poor faceplate seal? These two items will also have an affect on the pressure profile and fugitive emissions. (Note that this comment assumes the fuel delivery is refueling motor vehicles. This needs to be clarified.)

Response: ARB is concerned about these issues and has attempted to mitigate such occurrences within the protocol. Such occurrence is dependant upon the design of the nozzle vapor valve. Prior to start-up testing, ARB will ensure nozzle/dispenser compatibility. ARB staff will also train the closing attendant to ensure that the nozzles are hung properly in the dispenser prior to locking the nozzle at closing and also in the locked position.

O. Fugitive Emissions Calculation (WSPA)

43. **Comment:** Within the TP-201.2F procedure, does ARB intend to sample the UST headspace, or use the default assumption that the headspace concentration is 36% (as propane)? If sampling is to be conducted, how frequently will it be conducted, and what will the procedures be?

Comment: As we have commented to ARB in the past, TP-201.2F procedures in the protocol overstate fugitive emissions, since they assume that a system at a positive pressure (e.g., 1 inch w.c.) is leaking at the maximum allowable leak rate, yet do not check to see if that leak rate is consistent with the leak rate of pressure loss in the system. If a system is tight, pressures could rise during GDF shutdown purely as a result of changes in atmospheric conditions, with no emissions. (i.e., the rate at which a system which barely passes TP-201.3 testing). WSPA recommends that fugitives either be calculated based on the rate of pressure decrease during inactive time periods, or not calculated at all.

Response: Calculation of pressure-related fugitives is not included in the challenge mode protocol.

P. Inclusion of Leak Decay Data in Calculation (OPW)

44. **Comment:** How will the resulting pressure data be omitted from the 30-day average pressure information?

Response: Pressure data collected within 24 hours after the leak decay will be excluded and an additional day will be added to the duration of the challenge mode test. The challenge mode test will be longer than 30 days depending upon the frequency of leak decay testing. The protocol has been updated to reflect this requirement.

Q. ISD (ARID, VST, CAPCOA)

45. **Comment:** A bi-directional flow meter should be installed at each fueling position (Example Veeder-Root ISD flow meter). Nozzle vapor valves have demonstrated intermittent performance; therefore bi-directional flow meters would monitor the performance of all the hanging hardware. Since this technology is readily available it only makes common sense to remove this variable from the equation.

Comment: Does having the Phase II EVR equipment mean the station will also have ISD? If not, please explain why ISD will not be required for this.

Response: ISD systems are not installed at the challenge test sites in southern California. Nozzles will be locked at night to ensure that no one attempts to fuel during closing hours at the station. The station operator will ensure that nozzles are hung properly before locking them at closing.

R. Length of Shut Down (BAAQMD, OPW, WSPA, Franklin Fueling Systems,)

46. **Comment:** Under Test Conditions you require a daily station shutdown of at least 9 hours. We have concerns that this length of station shutdown may not represent the shutdowns experienced by most balance stations. Does your station data suggest that 9 hours is an appropriate shutdown time for challenge mode or would it be more reasonable to conduct challenge mode testing at some shorter time period such as 4-6 hours?

Response: See response to Comment 5.

47. **Comment:** What is meant by “at least 9 hours”? Is the duration subject to change throughout the 30-day period? OPW suggests a fixed daily duration or the daily duration is defined through a matrix. i.e. Day 1 is a 9 hour shutdown, Day 2 is a 9 hour shutdown, Day 3 is a 12 hours shutdown etc.

Response: The operating hours for the two GDFs used for this challenge mode test are as follows:

Monday – Saturday: 0600-2100
Sunday: 0900-1900

48. **Comment:** The draft protocol refers to “daily shutdown of at least 9 hours”. What is the rationale for choosing 9 hours? This is a relatively long period of time to shut down, and this requirement will make it difficult to find stations that have throughputs of greater than 150,000 gal/month, as specified in the protocol.

Response: See response to Comment 5.

49. **Comment:** I think the big issue that needs to be addressed is the 24-hour sites vs. non 24-hour. CARB wants 100% compatibility if a balance certification is granted, which is ridiculous. If 95% of sites can pass, it will be those 5% which force everybody to install a vapor processor. There needs to be a way to separate those who need a processor and those who do not. This could be the 24-hour/non 24-hour argument or something else. I would suggest everybody can install without a processor and if they begin failing the pressure profiles then they would need to install a vapor processor.

Response: At one time it was suggested that the certification Executive Order require that a balance system without a processor could only be installed at sites that operate for 24 hours a day. CAPCOA spokesman Dick Smith indicated in written correspondence that a 24 hour conditional Executive Order would not be enforceable. ARB staff maintain that the real issue is how busy the station is throughout the 24 hour period, and the frequency of fueling. These conditions are site specific, and as mentioned above, will not be supported in an Executive Order.

S. Location - Southern California (WSPA, Goodyear, ARID, Franklin Fueling Systems, CAPCOA, OPW)

50. **Comment:** The draft protocol requires a “Site location in Southern California”. This language should be clarified to refer to an operating retail gasoline outlet site, and the undefined reference to “Southern California” be replaced with site selection guidelines that would allow a station site in other suitable areas. We also request that ARB identify why this requirement is being applied.

Comment: Why must a challenge test be done in Southern California?

Comment: Please define more clearly “Southern California”. Is this in the San Diego area?

Comment: Why can't the 9 hour shutdown challenge be done at the Sacramento sites?

Comment: Why will the test station be required to be in Southern California? Is this to ensure a minimum temperature in the winter time, so there is the highest

temperature when using winter fuel (Bullet Item 3)? If so, the station should also be located inland and not on the coast to keep the temperature the highest.

Response: The objective of the Southern California site requirement is to run the challenge mode protocol at a GDF that experiences relatively high ambient temperatures in the winter months. For example, many sites located in the inland regions of Southern California have average high and average low temperatures approximately 10 degrees higher than that of the certification sites located in Sacramento. The warm fuel combined with high RVP fuel provides a challenge condition that cannot be simulated in the Sacramento region. The protocol will be revised to state the following: "The challenge mode shall be conducted in a region of the state that has relatively high ambient temperatures during the winter months when compared to the Sacramento region."

51. **Comment:** What altitude for the site in Southern California? Altitude impacts storage tank evaporative losses.

Response: The challenge mode protocol does not address altitude. ARB secured access to two sites in southern California for the challenge tests. The elevations are 986 feet and 879 feet respectively.

T. Lock Out of Nozzle (RSA, VST, CAPCOA)

52. **Comment:** How will nozzles be locked out during shutdown? This seems like a good idea.

Response: The nozzles will be manually locked each night with a pad lock by the station attendant. The objective is to ensure no fueling during shut down and avoid tampering with nozzle boot/vapor valve if applicable.

53. **Comment:** Will this be a requirement of the Executive Order (i.e., will the station be responsible for ensuring the nozzles are hung properly each night before the station is shut down)? If not, why make it a condition for the challenge test?

Response: ARB staff does not anticipate including a condition in the Executive Order to check nozzles each night, especially if a determination is made during the certification evaluation that the nozzle and dispenser are compatible. Staff incorporated this condition in the challenge mode test because the nozzles will be locked at night and we need to ensure that they are hung properly in the locked position.

U. Nozzle Vapor Valve Leak Integrity (Healy, Husky, VST, CAPCOA)

54. **Comment:** A ball valve should be installed on the vapor piping in each dispenser and closed during shut-down tests. Reason: Since balance nozzles (to my

knowledge) do not have a positive seal vapor valve (once the bellows is compressed the UST ullage pressure is wide open to atmosphere) you could have small leaks that the Veeder Root Meter will not detect (backflow). Also by having a ball valve in the closed position for the over-night shutdown tests would prevent someone from compressing bellows to reduce pressure growth and yield good data. The reason that the previous balance system pressure profile studies only show pressures of approximately -2" WC to slightly over atmospheric is that it takes very little volume to change pressure by 2" WC. For example, the formula we use is it takes 1/2 of 1% of ullage to change pressure 2". Assume you have 10,000 gallons of ullage and the UST pressure is at +2' WC, you would only have to release 50 gallons (6.68 cubic feet) of vapor to bring the ullage pressure to atmospheric (0) pressure.

Response: We concur that installation of ball valves would ensure no leaks or backflow during idle time. However, the system should be tested in normal operating mode. As stated prior, ARB staff will ensure nozzle/dispenser compatibility and the nozzles will be locked each night when the station closes. Also, the nozzles have an allowable leak rate and installing a ball valve in the vapor piping of the dispenser would result in a non-representative pressure profile.

55. **Comment:** Even if the nozzles are locked out the vapor valves can be opened.

Response: This is dependent upon the design of the nozzle. EVR balance nozzles may feature flow actuated vapor valves rather than bellows actuated. The vapor valve may only open when fueling product.

56. **Comment:** A bi-directional flow meter should be installed at each fueling position (Example Veeder-Root ISD flow meter). Nozzle vapor valves have demonstrated intermittent performance; therefore bi-directional flow meters would monitor the performance of all the hanging hardware. Since this technology is readily available it only makes common sense to remove this variable from the equation.

Response: The purpose of the challenge mode test is to evaluate pressure profile only. The certification test with ISD will provide information on the nozzle vapor valves.

57. **Comment:** Why is ARB so concerned about ensuring that the nozzles are hung properly? If this is a systemic problem, then shouldn't ARB be more concerned about the design of the dispenser hardware first before proceeding on with this test?

Response: Nozzles hung improperly may leak and bias the pressure profile toward compliance. Prior to the start of the monitoring period, ARB will ensure that the nozzle and dispenser are compatible. See response to Comment 42.

V. **Number of Test Sites (OPW, Goodyear, CAPCOA)**

58. **Comment:** South Coast assumes that based on this bullet item that the site will be located either in South Coast AQMD or San Diego APCD. Is ARB looking at only one test site and base all and any conclusions on this one test site?

Comment: Would this test site in Southern California take the place of one in Sacramento for the remaining tests (sealing etc.) or would two test sites be required?

It seems unrealistic to require a 2nd station to be equipped with an entire proposed EVR system. This not only adds additional expense to the manufacturers, but also consumes resources.

Response: The challenge mode test will take place at ARB selected sites. ARB tests will be conducted at no charge to the applicant. The applicant is responsible for installation, contractor support and necessary permits.

59. **Comment:** What type of station will the test be conducted at (i.e., the certification site, a backup site, a R&D site, or some other site)? There needs to be verification the challenge test site operates and behaves the same as the certification site (i.e., same V/L, etc.), to ensure we can justify using the data from both sites to certify or deny an application.

Response: The challenge mode protocol will be conducted at a site selected by ARB as described above. It is specifically chosen to be different from the certification site in order to evaluate the system under the challenge mode conditions. V/L testing is only conducted on vacuum assist sites. Dynamic back pressure tests will be conducted at both the challenge and certification test sites.

60. **Comment:** How many sites will be used for this challenge test? Only one (as implied by the language of the draft protocol)? If so, how do we know if this represents the worst case for generating pressure within the system? Would a summer fuel but in the warmest location in the State (summer in Barstow, Baker or Bakersfield, to keep within 100 miles of a CARB office) be the worst case instead of what is proposed here? If this is only a one time test, it must be proven to be the worst case the system will ever see in California, otherwise, the system should not be approved for use state-wide.

Response: The challenge mode protocol will be conducted at two sites in southern California during a time when there is no RVP requirement. See response to Comment 7.

W. ORVR vehicle population (CAPCOA)

61. **Comment:** There is no discussion about vehicle populations. As this is for challenge mode testing, we should work to ensure this is the worst case operating mode, including which type of vehicles (ORVR or non-ORVR) present the greatest challenge to the system.

Response: The balance system has been deemed ORVR compatible by ARB. The higher the percentage of ORVR vehicles the deeper the vacuum generated.

The type of vehicles which present the greatest challenge to the balance system would be 100% non-ORVR vehicle population, which at this time is not feasible or reasonable. The current ORVR vehicle population as of 2005, is approximately 40%. It is not possible to go back in time to 0% ORVR vehicle population.

X. Phase I Deliveries (ARID)

62. **Comment:** What about Phase I bulk drops and impact on pressure profile, will these excursions be part of the calculations or will these data be excluded?

Response: Phase I bulk drops will be included as part of the pressure profile calculation. However, pressure excursions due to cargo tank failures may be excluded as provided in section 4.6.1 of CP-201.

Y. RVP (OPW, WSPA, Goodyear, ARID, Husky, Franklin Fueling Systems, VST, CAPCOA)

63. **Comment:** What is meant by uncontrolled RVP? Suggest a minimum RVP be specified.

Response: Uncontrolled RVP refers to an RVP greater than 7 psi.

64. **Comment:** The draft protocol refers to “winter fuel (uncontrolled RVP)”. This appears to be a requirement that is only being applied to balance systems and not vac-assist systems; please identify why this requirement is being applied. In addition, since winter RVP’s can vary, the minimum acceptable RVP for this testing should be specified.

Comment: Winter RVP fuels – CARB should specify a minimum specification (Example 13.5 to 15.0 RVP)

Response: Due to difference in design, challenge mode protocol criteria are system specific. The challenge protocol has been revised to specify an uncontrolled RVP of greater than 7 psi.

65. **Comment:** How long is winter fuel in use?

Response: In the Sacramento region, winter fuel is in use from November 1 through April 30. In Southern California region, winter fuel is in use from November 1 through March 31. For further information, see RVP map at the following web site: http://www.arb.ca.gov/fuels/gasoline/rvp/carvp_clr.pdf.

66. **Comment:** Winter fuel during what season of the year: transition into Fall will yield worst case for evaporative losses: transition into Spring will reduce evaporative losses.

Response: The challenge protocol has been revised to specify an uncontrolled RVP of greater than 7 psi.

67. **Comment:** For RVP; perhaps sample before, during and after the testing interval.

Response: RVP will be sampled on a weekly basis. The protocol already specifies this requirement.

68. **Comment:** What is meant by uncontrolled RVP?

Response: The challenge protocol has been revised to specify an uncontrolled RVP of greater than 7 psi.

69. **Comment:** When, where and how is the RVP sample to be taken?

Response: Samples of gasoline are obtained by ARB fuel inspectors and then transported to the ARB laboratory in El Monte. At the laboratory, ARB chemists will analyze the gasoline in accordance with approved American Society for Testing and Materials (ASTM) test methods. For more information visit <http://www.arb.ca.gov/regs/title13/2297.pdf>

70. **Comment:** How will the RVP be incorporated into the pass/fail criteria? If the RVP is not at worst case can this void the entire test?

Response: If necessary, additional monitoring days will be added to challenge mode test if measured RVPs are less than the uncontrolled RVP condition specified above.

71. **Comment:** While winter fuel does not have a limit on RVP, it needs to be demonstrated that the fuel delivered to the test site has the same RVP (and not some special low-RVP fuel) as the rest of the stations in that market are receiving. Therefore, RVP samples should be collected from each fuel drop at that site, plus samples from nearby sites and the bulk terminals supplying the market.

Response: It is not necessary to sample fuel drops of other sites. The RVP of the fuel sampled from the UST is sufficient. As stated in the challenge protocol, RVP sampling will be conducted weekly.

Z. Temperature Data (ARID, VST)

72. **Comment:** For temperature reading in the storage tank; perhaps use an external thermocouple instead of relying upon the ATG probe.

Comment: For Temperature reading of delivered fuel, perhaps use an external thermocouple to measure delivered product temperature.

Comment: Temperatures should be monitored and recorded daily through the ATG system.

Response: The challenge protocol does not specify the monitoring of gasoline temperatures (the data acquisition system installed per TP-201.7 does not require fuel temperature monitoring). However, gasoline temperature readings will be acquired when printing the daily ullage and gasoline volumes from the ATG system.

AA. Timing of Challenge Mode in relation to Operational Test Period (OPW, WSPA, Franklin Fueling Systems, Goodyear)

73. **Comment:** What is meant by “conducted outside of the operational test”? Due to the fact that the proposed test must be performed on winter fuels (November to April), for half the year applicants will be forced to enter into an operational test with known uncertainty in terms of the probability of their passing. With no known method of simulating high RVPs and their interactivity with a given site outside of the winter fuels period, this test will likely delay applicants from entering into an operational test.

Comment: At what point would this challenge mode test be conducted (assume up front)?

Comment: When will the test be run? Will any balance application be on hold until the completion of the test or will it be run during the 180-days of a specific application?

Response: Applicants may begin the operational test before the challenge mode if winter fuels are not available.

74. **Comment:** The draft protocol refers to a “30-day test period to be conducted outside of the operations test (shorter test period may be considered, subject to ARB approval).” It is unclear whether or not this testing can be conducted concurrently with the 180-day field test; Basis is to verify compliance with section 4.6.1 of CP-201. ARB also needs to identify the basis for the length of the challenge test period.

Response: The challenge test at the southern California site may be conducted concurrently with the 180-day operational test (operational test to be conducted at site within 100-mile radius of Sacramento). This decision will be made by the applicant. The challenge mode test will last until 30 days of valid UST pressure data are obtained. The length of the challenge test was based on the need to obtain 30 days of valid UST pressure data in order to determine whether the pressure criteria in CP-201 can be met.

BB. Ullage / 50% Minimum (BAAQMD, OPW, WSPA, ARID Tech, Husky, RSA, Franklin Fueling Systems, VST, CAPCOA)

75. **Comment:** Under Test Conditions you require a minimum ullage of 50% during the test period. We have concerns that strict adherence to this condition might be difficult to comply with and we suggest that you allow some flexibility on this requirement. You might consider revising the protocol to allow occasional minimums down to 35-40% with some minimum average ullage condition specified.

Comment: What is meant by “during test period”. OPW believes it would be virtually impossible to maintain a 50% ullage for 30 consecutive days. Even assuming what was meant is “during the shutdown period”, OPW still believes this will be extremely difficult to accomplish. OPW suggests clarification on this subject be communicated to industry and a specific number of allowable days outside of the ullage requirements be specified.

Comment: The draft protocol refers to “minimum ullage of 50% during test period”. It should be clarified that for manifolded vapor spaces, ullage requirements refer to the combined ullage, rather than the ullage of each individual tank the requirement for “Minimum Ullage of 50% during the test period” needs to be clarified. We believe that the intent of the language is to indicate that the ullage should be between 0% and 50% (50% to 100% gasoline level). It is difficult to schedule product deliveries to stay within this window, and we request that ARB identify a technical reason for this requirement. To accommodate deliveries, WSPA suggest setting the allowable ullage level to 75% (25% gasoline level).

Comment: Perhaps maximum ullage of 50% during test period?

Comment: The larger the ullage, the less the pressure changes for the same amount of vapor growth.

Comment: Are you requiring that fuel drops be regulated so that there is always greater than 50% ullage during the testing? This seems as if it might be difficult for a station with a high throughput.

Comment: Please clarify the test condition: "Minimum ullage of 50% during test period". Does this test condition mean that the tanks should remain at least half full during the test period.

Comment: Minimum ullage of 50% during the test period may be too onerous on station operators particularly if the station is high volume throughput. The main interest should be high ullage during station shut down periods, perhaps require some number of days demonstrating this situation.

Comment: Is the 50% ullage required at all times, or only an average (only require records of this once per day)?

Response: The intent is to avoid extended periods (multiple days) of high ullage volumes during the protocol. ARB considers high ullage as those greater than 20,000 gallons. The ullage condition has been removed from the challenge protocol.

CC. Vapor Processor (ARID)

76. **Comment:** Contemplate the extension of the challenge test to measure a daily average pressure, a daily high pressure, and pressure related fugitives on the same site equipped with vapor processor. ARID pleased to provide a PERMEATOR as part of the study.

Response: Thank you for the offer. The decision to use a processor will be up to the applicant.

DD. Other (WSPA, RSA)

77. **Comment:** Last but not least, we ask the ARB to not discourage equipment manufacturers from developing new technologies. In addition to the conditions in the draft protocol which (to our knowledge) have not been previously identified to equipment manufacturers, your cover letter stated that "the enclosed protocol is not all inclusive and that ARB staff may develop further challenge mode tests as ARB gains more knowledge about the balance vapor recovery system during

certification evaluation.” Such as statement could discourage equipment manufacturers from attempting to go through the certification process because new performance criteria could be imposed anytime that their system was designed to pass. Balance systems have been in use for many years and there should be no revelations about their performance or operation that warrant additional unspecified test requirements. We encourage ARB to finalize the challenge test conditions and make them reasonable, relevant and widely available to encourage manufacturers to certify their equipment. It is important for system manufacturers to have as much insight as possible as to what requirements need to be met.

Response: We agree that certification requirements be specified up front as much as possible. However, ARB is responsible for certifying systems that will operate successfully at GDFs under a variety of typical conditions. If issues arise during system certification that trigger concerns for operation of the system at typical station conditions, these issues will be investigated and additional tests may be warranted.

78. **Comment:** Is there a possibility of seeing the data from the February test as well as this test?

Response: Information from ARB tests can be made available through a public records act request. Visit <http://www.arb.ca.gov/html/recordsaccess.htm> for further information.