ARB Vapor Recovery Program
Advisory 405-D FAQ

BACKGROUND

1. **What is the function of an in-station diagnostics or ISD system?**

   The function of the ISD system is to provide continuous and real time monitoring of the vapor recovery system and alert gasoline dispensing facility (GDF) owners/operators of equipment failure(s) so that corrective action can be taken promptly. ISD systems help to prevent the release of gasoline vapors to the environment by early detection and prompt repair of vapor recovery equipment failures.

2. **What is the history of ISD?**

   In 2001, the Air Resources Board (ARB or Board) established performance standards for the certification of ISD systems designed for use with GDF equipped with underground storage tanks (UST). In 2005, the Board certified the first ISD system for the Phase II EVR Assist System. In 2008, the Board certified the first ISD system for the Phase II EVR Balance System.

3. **How many ISD systems are currently certified?**

   As of September 2016, there are four ISD systems certified by two manufacturers. Veeder-Root and INCON (a division of Franklin Fuel Systems) are each certified for use with the Phase II EVR Assist System and the Phase II EVR Balance System.

4. **How many gasoline dispensing facilities (GDF) in California are equipped with ISD?**

   According to a survey conducted by ARB staff in 2013 of local air pollution control districts, ISD systems are currently installed at approximately 7,500 GDFs[1] throughout California.

[1] GDFs with an annual throughput of 600,000 gallons or less or located in an area that is in attainment of state health based ambient air quality standard for ozone are exempt from ISD.

5. **Has ISD been tested to assess reliability?**

   Yes. The certification process included an operational test of at least 180 days at an operating GDF. During the certification process, the ISD system must demonstrate the ability to operate 95 percent of the time and be capable of detecting a failure with a 95 percent probability level with a false alarm detection rate of no more than one percent. A false alarm is when the vapor recovery system is functioning properly but the ISD system issues an alarm.

   The ARB and members of the California Air Pollution Control Officer Association (CAPCOA) jointly conducted an 18-month study of the accuracy and performance of the ISD system. Study results confirmed that ISD consistently performed as expected. In addition to certification testing, the in-use performance of ISD systems are continuously evaluated by service providers and local air districts during routine inspections and compliance testing at GDFs.

6. **What is the difference between a "warning alarm" and a "failure alarm"?**

   A warning alarm means that critical vapor recovery parameters have been exceeded (for example, the ability of the nozzle to collect the proper amount of vapor, the development of leaks within the containment system, or the excess pressure in the headspace of the UST) or the vapor processor has malfunctioned. The purpose of the warning alarm is to provide the GDF owner/operator time to contact a service provider and request troubleshooting and repair. If warning alarms are ignored and the problem persists, a failure alarm is activated. Activation of the failure alarm would result in the termination of gasoline dispensing at either specific dispensers or at the entire facility, depending upon which parameter resulted in the failure.

7. **What parameters are monitored by ISD?**

   The ISD system monitors a range of GDF operating parameters and alerts the station operator to equipment problems that require attention. Parameters monitored by the ISD include the collection and containment of gasoline vapors and the operation of the vapor processor. If predetermined thresholds are exceeded, an alarm is triggered; alerting the GDF operator to call a service technician for troubleshooting and repair.

8. For overpressure, are the warning alarm and failure alarm criteria different for the two currently certified systems?

Both the INCON and Veeder-Root ISD systems are certified to the same performance standards outlined in ARB Certification Procedure CP-201.[2] Both ISD systems are required to monitor collection and containment of the vapor recovery system, such as excessively high or low vapor collection, containment system vapor leakage, and equipment problems.

In terms of overpressure alarms, the INCON system monitors UST ullage[3] pressure based on the amount of time the pressure exceeds a threshold over a fixed period of time (seven days or 30 days). If the containment pressure exceeds the overpressure limits for either the seven day or 30 day thresholds, the INCON system will issue a warning alarm. A second consecutive period exceeding the overpressure threshold will result in a failure alarm and shutdown of all dispensers.

The Veeder-Root system monitors ullage pressure on a similar basis, but uses a rolling seven day average and a rolling 30 day average to determine if a warning alarm should be triggered. A second consecutive period exceeding the overpressure threshold will result in a failure alarm and shutdown of all dispensers.

9. What are "transient" alarms and what cause them?

The term "transient" alarm was coined by ARB staff and is used to describe an ISD warning alarm that self-clears and does not persist into a failure alarm. Transient alarms are typically associated with ISD nozzle collection assessments on mid-grade or premium grade fueling points which fuel a higher percentage of vehicles equipped with on-board refueling vapor recovery. If a GDF is faced with excessive transient warning alarms, ISD settings can be adjusted and/or ISD software upgrades are available. GDF operators should contact their local service provider, local air district, and local CUPA prior to upgrading ISD software.

[2] CP-201 can be found at https://www.arb.ca.gov/testmeth/vol2/CP201_april2016.pdf.
[3] Ullage is the vapor headspace above the gasoline liquid level in USTs.

OVERPRESSURE ALARMS

10. What is an ISD overpressure alarm?

As mentioned in response to question 7, ISD monitors the pressure of the ullage space inside USTs. An ISD overpressure means that the positive pressure of this space exceeds 1.5 inches water column (WC) for more than 8.4 hours in one week or exceeds 0.5 WC for more than 7.5 days in a 30 day period. Exceeding these levels will result in an overpressure warning alarm. Please note that 1.0 WC is equal to 0.0361 pounds per square inch.

11. When do the majority of ISD overpressure alarms occur?

Overpressure alarms occur primarily between November and March, the period when winter blend gasoline is sold. Winter blend gasoline is not subject to controls pertaining to Reid Vapor Pressure, which is a measure of volatility. Winter blend gasoline has a higher Reid Vapor Pressure and is of higher volatility.

12. Why are overpressure alarms important?

ARB's vapor recovery regulations are designed to minimize positive pressure in the headspace of the UST in order to prevent venting of gasoline vapors to atmosphere and fugitive emissions from components with allowable leak rates. Such emissions will interfere with efforts to attain and maintain health-based air quality standards for ozone and efforts to reduce exposure to benzene, a constituent of gasoline and a toxic air contaminant.

13. What happens if ISD overpressure alarms are ignored?

Assuming the overpressure condition persists, ignoring an ISD overpressure warning alarm would result in a failure alarm, thus resulting in shut down of gasoline dispensing operations for the entire GDF.

14. What is the ISD overpressure alarm phenomenon?

The ISD overpressure alarm phenomenon is a term used to describe an unusually high number of ISD overpressure alarms that occur during winter months without underlying vapor recovery equipment problems.

15. When was the overpressure alarm phenomenon first reported?

It was first reported to ARB in late 2008 and then became more widespread in 2009 and 2010, as ISD was fully implemented at GDFs throughout California.

16. Why are ISD overpressure alarms problematic?

In addition to the release of gasoline vapors to the atmosphere, ARB staff has estimated that 90% of overpressure alarms that occur during the months when winter blend gasoline is in use are not attributed to a vapor recovery-related equipment problem. Responding to such alarms is costly and disruptive to GDF operators.

17. Is the frequency of the overpressure alarm phenomenon remaining stable?

No. Field studies conducted by ARB staff between 2011 and 2015 indicate the frequency of the overpressure alarms is increasing by approximately 10%-15% year over year.

18. What is the cause of the increase in overpressure alarm phenomenon frequency?

The primary contributor is winter blend gasoline which, unlike summer blend gasoline, is not subject to a volatility standard between November and March. The number of overpressure alarms increase dramatically in November and decrease just as dramatically in April , matching the time frame at which petroleum refiners are required to switch between summer and winter blend gasoline.

Other contributing factors are related to GDF monthly throughput, GDF operating hours, GDF maintenance practices, and ORVR vehicle population and fill pipe design. ORVR fill pipe design has changed dramatically since the early 2000's when the currently certified nozzles were initially designed.

ISD ALARM RESPONSE POLICY

19. How was the original enforcement policy developed?

In the mid-2000s, associations representing GDFs expressed concern about disparate enforcement of ISD alarms by various air districts and requested a

consistent statewide enforcement policy. In response, ARB and the California Air Pollution Control Officers Association (CAPCOA) instituted an enforcement policy for ISD alarms in 2006 for a trial period of 18 months that was generally adhered to by air districts. The policy was informally extended indefinitely beyond the 18 months.

20. What were the main points of the 2006 Enforcement Policy?

The policy requires GDF attendants to notify the responsible company official within two hours of the initial warning alarm. The official must then request service as soon as reasonably possible to correct the problem. If the failure alarm is activated, ISD may be reset only after all required repairs have been completed, the dispenser associated with the problem is isolated and taken out of service until repairs are completed, and all repairs are recorded on an air district-approved form. In rural areas (defined as a county with a population of less than 132,000), air districts may allow the ISD failure alarm to be reset for good cause (e.g., unavailability of certified repair technicians or parts), if repairs cannot be accomplished within seven days.

21. Why was Advisory 405 released?

Advisory 405 was developed cooperatively by ARB staff and CAPCOA and released on October 6, 2009. This advisory provided relief to GDF owners/operators from transient alarms. In addition, the Advisory relaxed the Enforcement Policy requirements of having to call for service for overpressure alarms by allowing GDF owners/operators to reset the subject ISD alarms if a certified service technician was not able to find equipment problems after the first visit during the time of year when winter gasoline is sold. This advisory expired on September 1, 2010 and was superseded by Advisory 405-A.

22. What were the key components of Advisories 405-A to D?

a. Advisory 405-A

Advisory 405-A was issued on November 8, 2010 and contained two amendments to the original Advisory 405. The first amendment allowed GDF operators/owners to clear ISD overpressure alarms that occurred between November 1 and January 31. During the period between February 1 and March 31, prescribed tests listed in the advisory were required to be

conducted in order to quality for 30 day relief. This amendment expired on April 1, 2011.

The second amendment applies to responses to all ISD alarms. With the exception of the 24 hour failure alarm, GDF owners/operators can wait as long as 48 hours before calling for service. For transient warning alarms, owners/operators are not required to call for service or may cancel a service call. The amendment remains in effect until rescinded.

b. Advisory 405-B

Advisory 405-B was issued on December 27, 2011 and will remain in effect until formally rescinded by ARB. GDF owners/operators are not required to call for service in response to ISD overpressure alarms that occur between November 1 and March 1 but are required to call for service in response to ISD alarms that occur between March 2 and October 31.

c. Advisory 405-C

Advisory 405-C was issued on February 24, 2015 and will remain in effect until formally rescinded by ARB. GDF owners/operators are not required to call for service in response to ISD overpressure alarms between November 1 and March 31 but are required to call service in response to ISD alarms that occur between April 1 and October 31.

d. Advisory 405-D

Advisory 405-D was issued on September 28, 2016, and was jointly developed by ARB staff and CAPCOA. The intent of this advisory is to consolidate and specify responses to ISD alarms and to provide relief to ISD overpressure alarms that occur during the period from November to April. Advisory 405-D will supersede the 2006 Enforcement Policy and Advisories 405, 405-A, 405-B, and 405-C, and will remain in effect until formally rescinded by ARB.

The key components of Advisory 405-D are as follows:

i. Facility attendants are required to notify the responsible official within two hours of an ISD warning alarm.

ii. The responsible official will decide whether or not to call for service knowing that a failure alarm will activate if the problem persists. Only a certified technician can repair the system.
iii. For transient warning alarms, the responsible official is not required to call for service or may cancel a service call.
iv. If service is called for a warning alarm, the warning alarm cannot be cleared unless certain steps are taken. These steps include the completion of all required repairs and tests specified in the air district permit, removing the fueling point with the problem from service, or obtaining a Conditional Order of Abatement or other administrative relief from the air district.
v. ISD overpressure alarms that occur between November 1 and March 31 may be cleared without repairs or testing. A contractor must be called to clear any ISD overpressure alarms that occur between April 1 and October 31, as well as any alarms not related to the overpressure phenomenon.

23. Are there any differences for responding to ISD alarms in rural versus urban areas?

No. Advisory 405-D provides the same mechanism for obtaining relief to both rural and urban areas.

24. How should I respond to an ISD warning alarm?

Under Advisory 405-D, the GDF attendant is still required to contact the responsible company official within two hours. The responsible official will have the discretion of whether or not to call for service knowing that the failure alarm may shut down dispensing.

25. How should I respond to an ISD failure alarm?

Failure alarms will result in termination of gasoline dispensing either at a specific fueling position or the entire facility. With the exception of ISD overpressure alarms that occur between November 1 and March 31, the ISD system may be reset to allow vehicle fueling to resume only if:

- All required repairs have been made and all information associated with the repairs is recorded on an air district-approved form that shall be maintained at the GDF and made available to the Executive Officer/Air Pollution Control Officer or their designee upon request; or

- The dispenser(s) associated with the problem that activated the failure alarm is isolated, removed from service and not operated until the required repairs are completed and, when completed, all information associated with the repairs is recorded on an air district-approved form that shall be maintained at the GDF and made available to the Executive Officer/Air Pollution Control Officer or their designee upon request

26. Where can I find specific requirements for responding to ISD alarms?

Specific requirements for responding to ISD alarms can be found in

Advisory
405-D, which is posted online here:
https://ww3.arb.ca.gov/vapor/advisories/adv405d.pdf

27. Who can make repairs or reset ISD alarms?

See response to Question 25 of this section.

28. How should a GDF owner/operator respond to an ISD alarm?

See response to Question 22.d of this section.