

In-Station Diagnostics (ISD) Over Pressure (OP) Alarms

Public Workshop
September 20, 2013
Sacramento, California

California Environmental Protection Agency

 **Air Resources Board**

Presentation Outline

Section 1: Background

Section 2: OP Study & Preliminary Conclusions

Section 3: New Information Obtained After Fall 2012 Workshops

Section 4: Plan for New Field Studies

Section 1

Background

The Public Participation Process

**Two or Three
Public Workshops
Sept 2013 – June 2014**

**45-day Comment Period
For Rulemaking
Oct – Nov 2014**

**Board Hearing
Nov 2014**

Informal Process

Discuss research activities, field studies and findings of Over Pressure Study

Present concepts and draft regulatory language

Solicit and consider stakeholder feedbacks on concepts and draft language

Formal Process

Staff publishes the proposed regulatory change and provides reasons including costs and impact (original proposal)

Public may submit written or oral comments on staff's proposal to Board

Final Stage

Staff presents proposal to Board

After considering all comments, Board may accept proposal and direct staff to address any remaining issues, or reject the proposal

Public has 15 days to submit comments on any changes made to the original proposal

EVR/ISD Implementation

- Phase II EVR including ISD fully implemented in 2010.
- GDFs with an annual throughput greater than 600,000 gallons are subject to ISD.
- There are approximately 10,000 GDFs in California. It is estimated that 8,000 are equipped with EVR and ISD.

ISD Performance Assessments

- ISD continuously monitors the performance of the vapor recovery system (VRS) and alerts the operator when failures are detected.
 - One of the assessments performed by ISD involves continuous monitoring of pressure in the headspace of the underground storage tank.
 - Over Pressure, means that one of the ISD thresholds illustrated in the next slide have been exceeded.

Current ISD OP Alarm Criteria

Assessment Period	Current ISD OP Alarm Criteria
Weekly Assessment	5% of pressure data above 1.5"WC (Section 9.2.4).
Monthly Assessment	25% of pressure data above 0.5"WC (Section 9.2.4).
Daily Assessment (Processors Only)	Daily assessment to identify vapor processor malfunction (Section 9.2.5).

ISD OP Alarm Problem Defined

- A situation in which the equipment inspection, testing, and troubleshooting conducted in response to an ISD OP alarm fails to identify an equipment malfunction.

How Common are OP Alarms?

OP Alarm Frequency for 52 Sacramento Area GDFs
Alarm History Data from 11/2009 through 03/2011

OP Alarms per Year	No. of GDF	% of GDF
None	18	34.6%
Greater than 0 less than 1	6	11.5%
Greater than 1 less than 2	9	17.3%
Greater than 2 less than 4	5	9.6%
Greater than 4 less than 8	6	11.5%
Greater than 8 less than 12	4	7.7%
Greater than 12	4	7.7%

Relief from OP Alarms

- Advisory 405 was issued on 10/6/09 and expired on 09/01/10.
- Advisory 405-A was issued on 11/8/10 and expired on 04/01/11.
- Advisory 405-B was issued on 10/10/11 and remains in effect until rescinded.
- Update planned for Oct 2013 to include recently certified systems.

Section 2

OP Study

Five Preliminary Conclusions

OP Study

- Purpose: Determine cause of OP alarms in winter fuel season and quantify emissions caused by positive pressure.
 - Duration of Original Study: November 2009 - March 2012
 - Six GDFs located in the Sacramento area used for Emission Analysis.
 - Six sites selected to obtain variability in throughput, operating hours, VRS, and ISD system.
 - Study also includes analysis of ISD alarm history and service records collected from 45 Sacramento GDFs, 85 San Diego GDFs and over 200 Major Oil GDFs located in various regions of the state.

Conclusion 1 : No Trouble Found in Most OP Alarm Responses

- During the winter, about 90% of OP alarms are not related to a vapor recovery equipment malfunction.
- During the summer, about 70% of OP alarms are not related to a vapor recovery equipment malfunction.

Conclusion 2: Effect of Winter Fuel

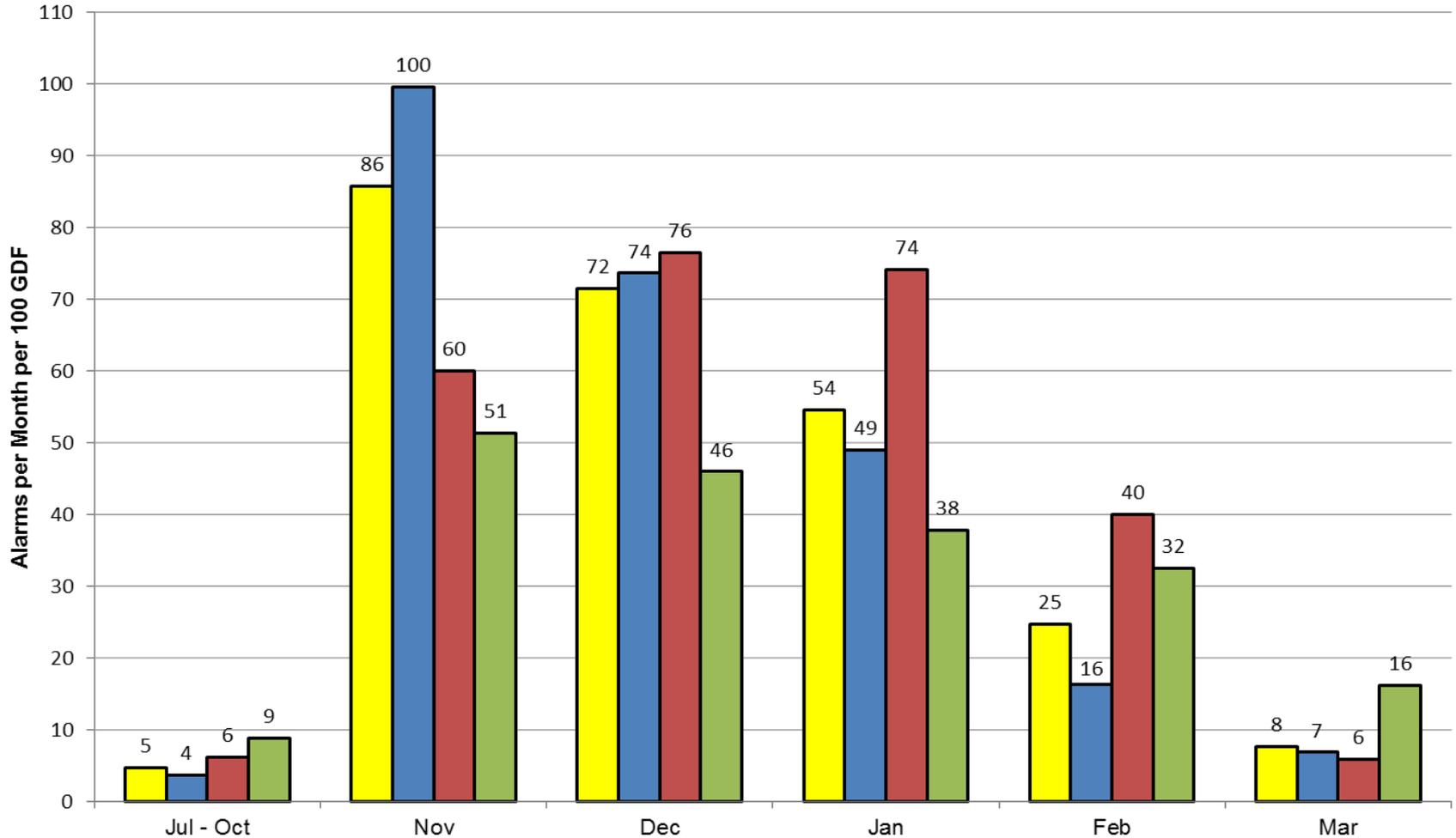
- OP alarms increase significantly in the winter because of high RVP fuel.
- OP alarms are related to high pressure that occurs during periods of low gasoline dispensing rates and/or extended shut downs.

Conclusion 2: Effect of Winter Fuel (continued)

ISD Over Pressure Alarm Trend

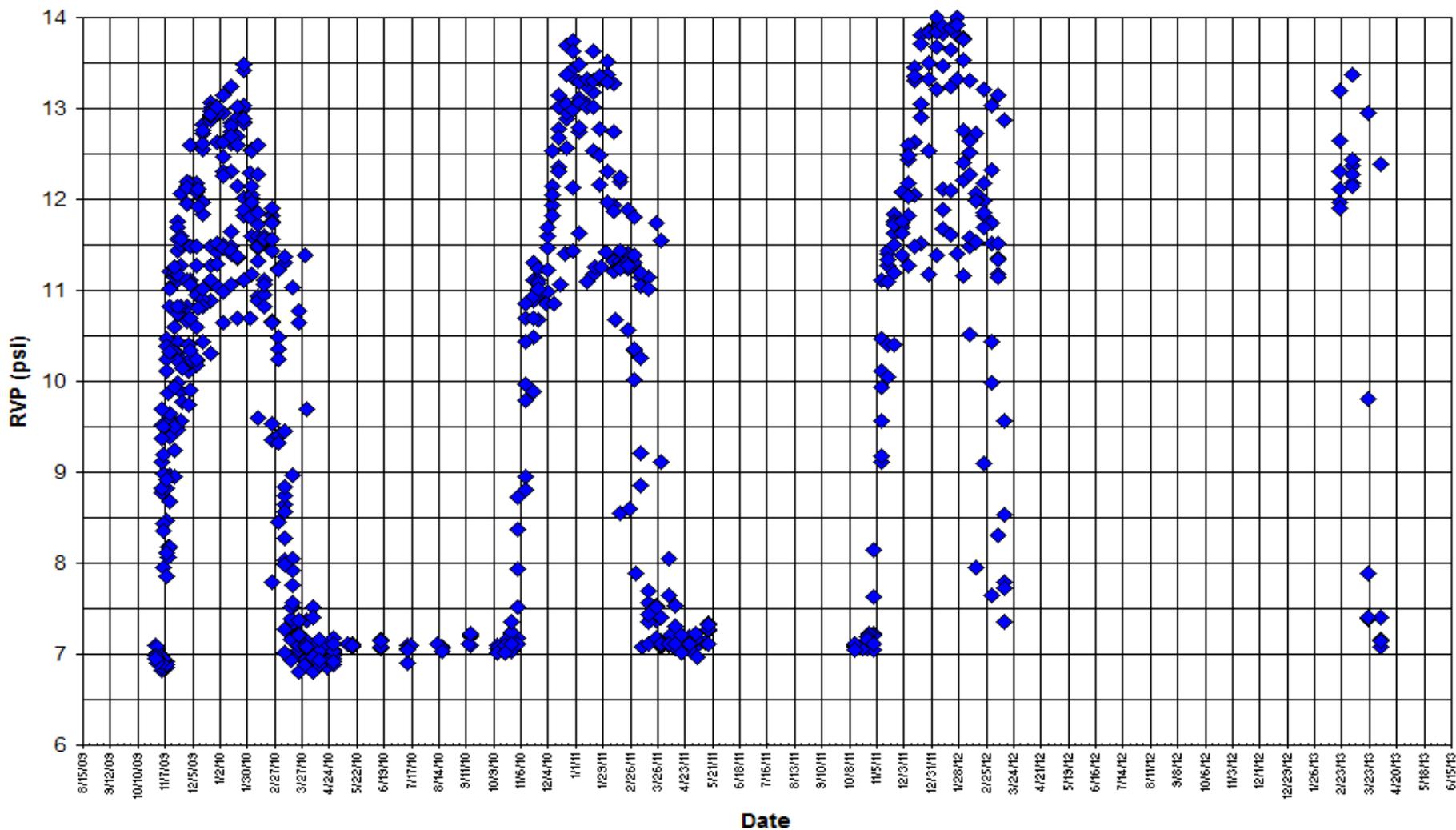
(SDC APCD data is 2010-11 all other is 2009-10)

■ 3 Data Sets Combined ■ Major Oil Co - 250 GDF Jul-Dec, 190 GDF Jan-Mar ■ 85 GDF - SDC APCD ■ 37 Sacramento Area GDF w/ Healy



Conclusion 2: Effect of Winter Fuel (continued)

Regular Gasoline RVP
October 23, 2009 to April 3, 2012



Preliminary Conclusion 3: Stringency of ISD Performance Standards

- The ISD pressure profile standards can be more stringent than the pressure profile standard required for VRS certification.
- With the exception of ISD monitoring for OP, the ISD thresholds are less stringent than the standards for VRS certification.

Preliminary Conclusion 4: Emissions Associated with Positive Pressure

- Annual averaged statewide emissions associated with positive pressure do not exceed 1 ton per day.

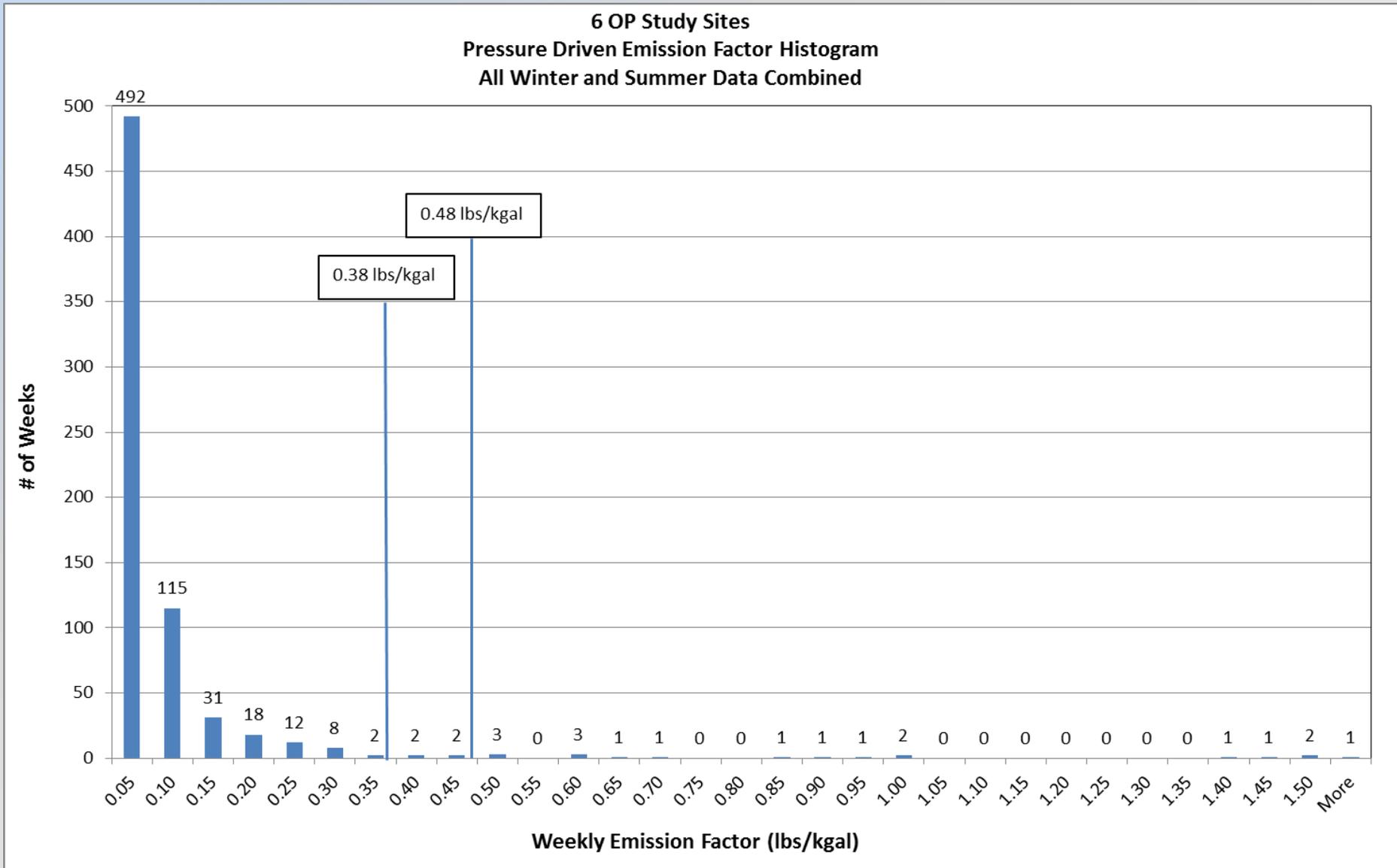
Preliminary Conclusion 5: Effect of Leaks on Over Pressure Alarms

- Systems with poor static pressure performance have a lower tendency to experience over pressure alarms.

Emission Based Alarm Criteria will Reduce Alarms and Identify Defects

- Fall 2012 workshop presented proposed alarm standards for pressure driven emissions of 0.38 lb/kgal summer and 0.48 lb/kgal winter.
- Based on emission estimates generated from 700 weeks of data from six OP Study Sites, alarms would be reduced from 128 to 17 (87%).
- 15 of 17 (88%) Emission Based Alarms were related to equipment failure.

Effectiveness of Emission Based Alarm Criteria



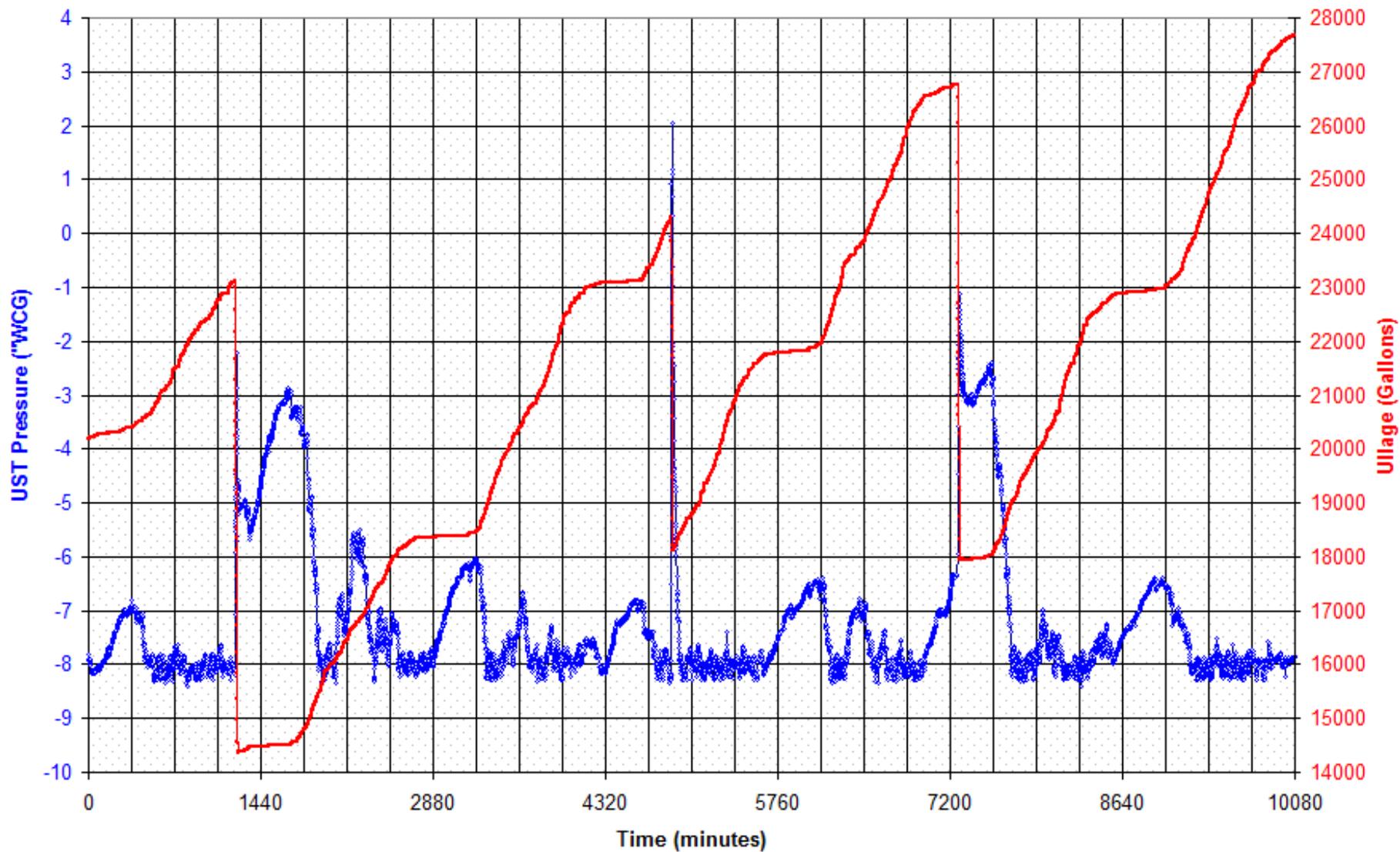
Section 3

New Information Obtained After Fall 2012 Workshops

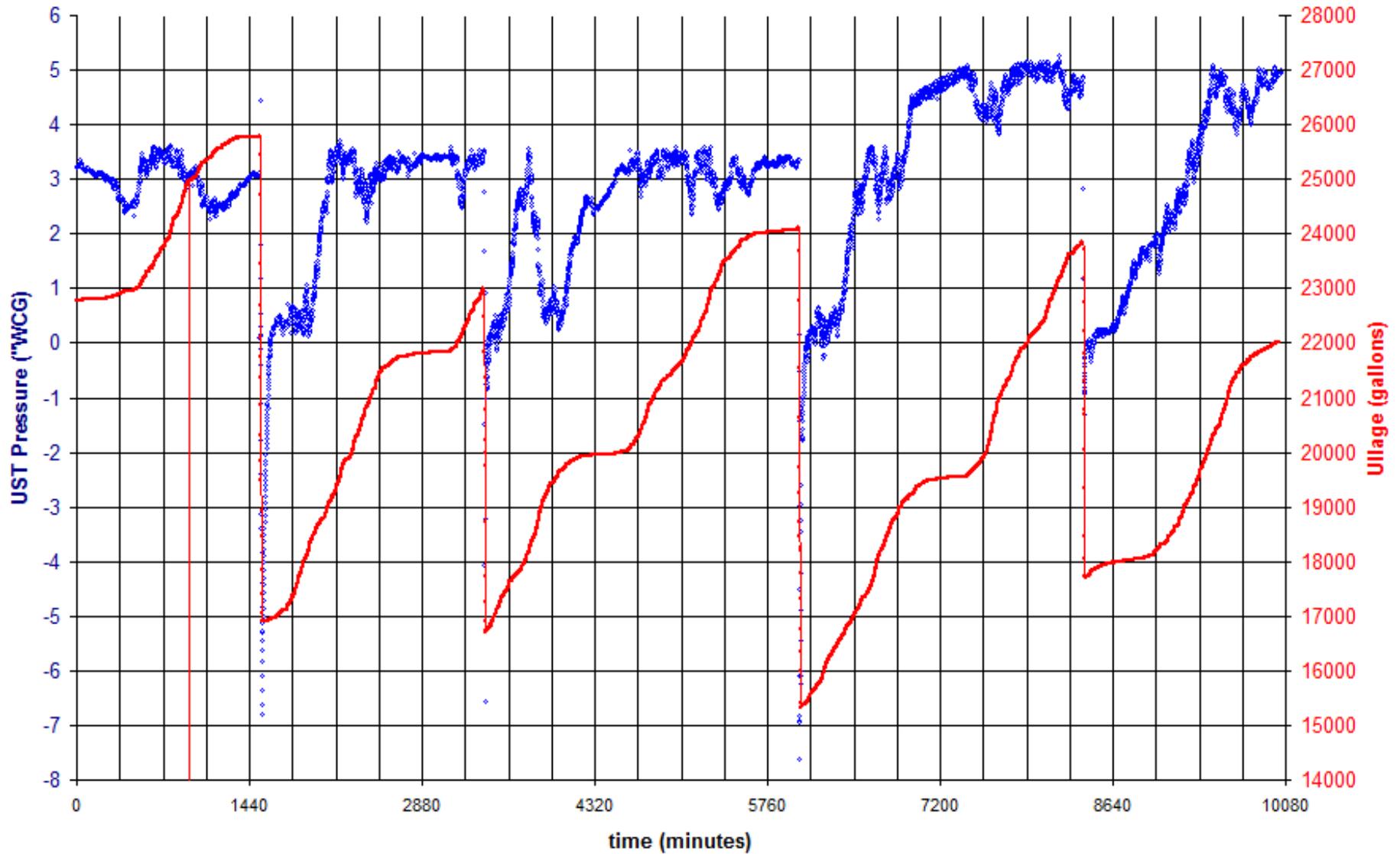
New Information

- During the 2012-2013 winter fuel season, a group of Southern California GDFs exhibited rising pressure during dispensing.
- Over pressure was present for prolonged periods of time.
- During the previous two winters these sites exhibited approximately 1/3 the number of alarms that occurred during Winter 2012-2013.

Example of GDF Showing Vacuum During Dispensing



Example of GDF Showing Pressure During Dispensing



Over Pressure at the Southern California GDFs Unlikely to be Caused by Equipment Defects

- All sites exhibited rising pressure during dispensing in the 2012-13 winter fuel season.
- Occurred over long periods of time at 75% of sites.
- Absence of high V/L alarms related to nozzle issues and dispenser leaks.
- Performance testing at two sites did not identify defects that would cause severe over pressure.
- Pressure profiles unchanged after testing and minor repairs.

New Information Conflicts with Some Preliminary Conclusions

Preliminary Conclusion

Under a proposed emission based standard, nearly all alarms would be linked to equipment malfunction or an extended shut down

Annual averaged statewide emissions associated with positive pressure do not exceed 1 ton per day

New Information

Under the proposed alarm criteria a significant number of alarms could still occur at these sites in the absence of any equipment malfunction

Pressure driven emissions may be higher than the emission estimate developed from the original study site data

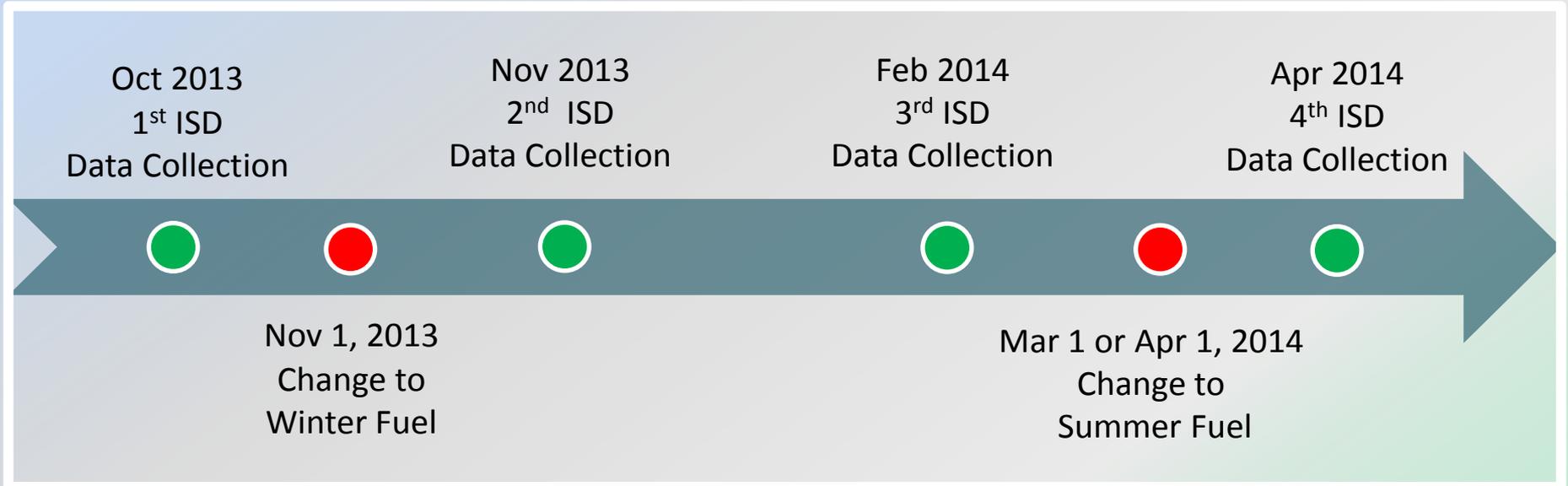
Answers Needed

- What effect does this new information have on the effectiveness of the solution proposed last fall?
- What is the statewide percentage of GDFs that experience over pressure during dispensing operations?
- How will the statewide emission estimate be affected by including GDFs operating in this manner?

Section 4

Plan for New Field Study

ISD Data Collection Schedule



OP Study Sites
October 2013 to
April 2014

- Data Collection at new Southern California OP Study Sites
- Data used to estimate pressure driven emission factors for sites with prolonged over pressure during dispensing operations

ISD Data Collection

(continued)

- Plan to collect ISD Data from approximately 400 GDFs located in 9 defined geographic regions which contain approximately 95% of the GDFs in California.
- The sample number in each region will be weighted based on the percentage of the State's GDFs that are located in the District.
- Two regions will be oversampled to supplement data from previous sampling efforts.

Sample Distribution for Field Study

400 ISD Data Downloads (5% sample size)

District or Multi-District Region	South Coast AQMD	Bay Area AQMD	San Joaquin Valley Unified APCD	Central Coast, North Coast, S.E. Desert, Mountain Co. Regions	San Diego Co. APCD	Sacramento Valley Region	Regions not Sampled
% of Statewide GDF w/ ISD	40.3%	17.1%	11.3%	11.1%	8.3%	6.9%	4.9%
Target Number of GDF ISD Downloads	136	58	38	37	28	23	0
Target Number of Assist ISD Downloads	93	36	25	26	NA*	NA*	0
Target Number of Balance ISD Downloads	43	22	13	12	NA*	NA*	0
Number of Oversampled GDF ISD Downloads	0	0	0	0	57	23	0
Total Downloads Per District or Multi-District Region	136	58	38	37	85	46	0

Regions Represented in the ISD Data Collection Field Study



Data to be Collected from 400 Sites



ISD Data

- All alarm history data available (at least 1 year)
- Available pressure and ullage data
- Available records on last 10 deliveries to gather available data on fuel temperature
- V/L data on for recent vehicle fueling events



GDF Characteristics

- Operating hours
- Throughput
- Gasoline brand
- Inventory report with tank capacities

ARB Would Accept Additional ISD Data Submissions

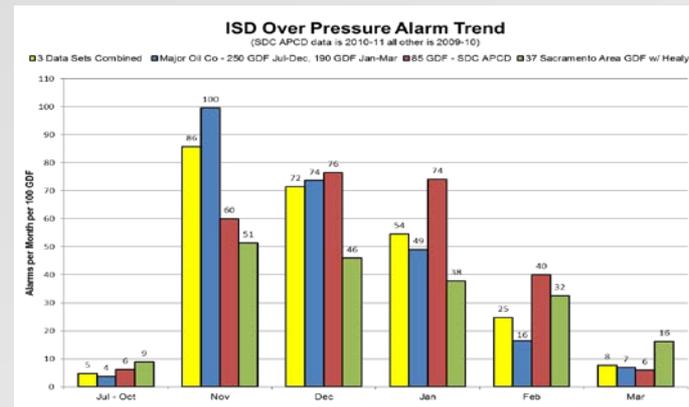
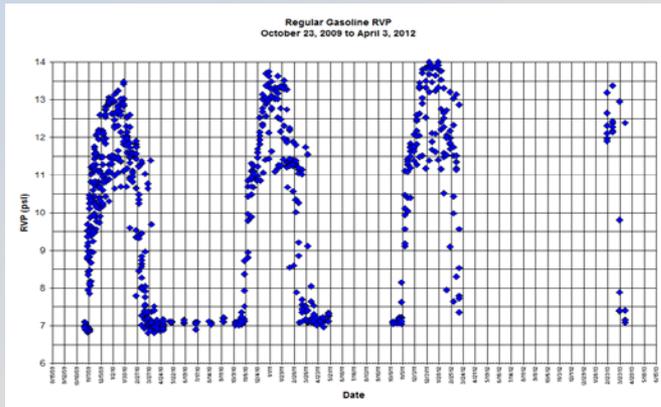
- Stakeholders may be concerned that their operations are not be represented by the 400 sites surveyed
- ARB will accept ISD data submissions for other GDF sites
- Additional sites must include all information listed on previous slide

Analysis Planned

- Determine the percentage of sites that exhibit over pressure during dispensing on a regional and statewide basis.
- Add new Southern California study sites to estimate pressure driven emission factors for sites with prolonged over pressure.
- Use this information to revise over pressure emission estimates.

Other Information Sought

- Recall that data shows strong correlation between over pressure and fuel RVP



- ARB is interested in data that would illustrate how gasoline RVP will vary by:
 - Production Facility
 - Geographic Region
 - Date of Production
 - Means of Distribution
 - Gasoline Composition

Questions / Comments

- Field Study will begin in October
- We need to hear from you by September 27 to consider your comments before data collection begins



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