California Environmental Protection Agency

Air Resources Board

Regulatory Solution to Provide Relief from In-Station Diagnostics (ISD) Over Pressure (OP) Alarms

Conceptual Workshops
October 31, 2012 - Sacramento
November 2, 2012 - Diamond Bar
November 7, 2012 - Fresno

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Presentation Outline

- Section 1: Background
- Section 2: OP Study Description
- Section 3: OP Study Conclusions
- Section 4: Proposed ISD Standard

Background

EVR/ISD Implementation

- Phase II EVR including ISD fully implemented in 2010.
- Approximately 10,000 GDFs were upgraded to EVR with approximately 8,000 GDFs upgrading to EVR with ISD.
- GDFs with an annual throughput greater than 600,000 gallons are subject to 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 (CARB CP-201 Section 9.2.4).
Monthly Assessment	25% of pressure data above 0.5"WC (CARB CP-201 Section 9.2.4).
Daily Assessment (Processors Only)	Daily assessment to identify vapor processor malfunction (CARB CP-201 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 any equipment malfunction.

Relief from OP Alarms

Advisory	Issued	Expiration
405	10/6/09	9/1/10
405-A	11/8/10	4/1/11
405-B	10/10/11	Remains in effect until rescinded

OP Study Description

OP Study

- Purpose was to determine cause of OP alarms during the winter fuel season and to quantify emissions caused by positive pressure.
  - Duration of Study: November 2009 - March 2012
  - Six GDFs located in the Sacramento area selected to obtain variability in throughput, operating hours, VRS, and ISD system.
  - ISD alarm history and service records collected from:
    - GDFs located in Sacramento and San Diego region
    - Major Oil companies

OP Study Conclusions

Conclusion #1 - No Trouble Found (NTF) in Most OP Alarm Responses

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

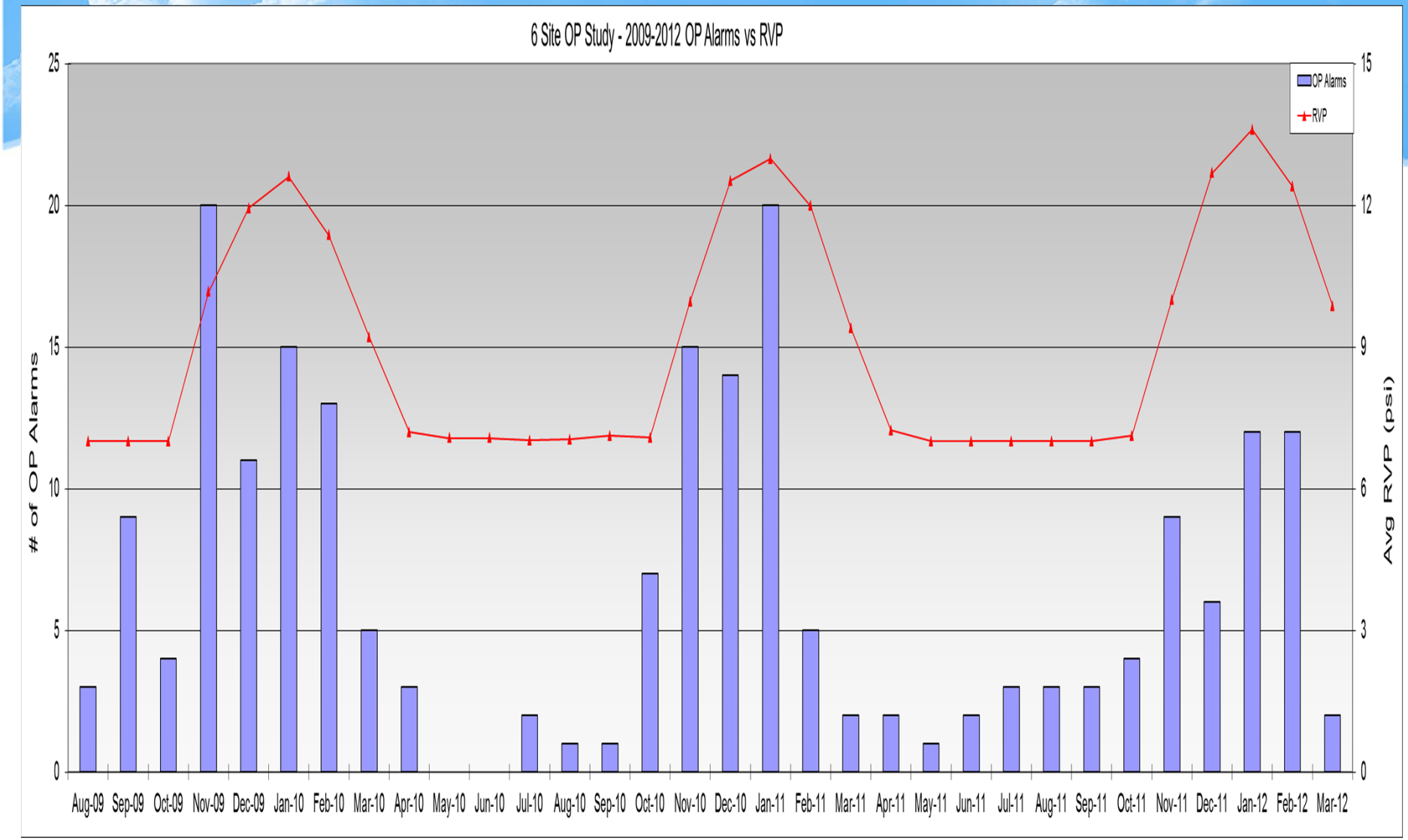
- During the summer, about 70% of OP alarms are not related to a vapor recovery equipment failure or malfunction.

Conclusion #2 – Effect of Winter Fuel

- OP alarms increase significantly in the winter because of high Reid Vapor Pressure (RVP) fuel.

- OP alarms occur during periods of low gasoline dispensing rates and/or extended shut downs.

Conclusion #2 – Effect of Winter Fuel



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.

Conclusion #4 - Emissions Associated with Positive Pressure

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

Conclusion #5 – Effect of Leaks on Over Pressure Alarms

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

Proposed ISD Standard

Proposed ISD Standard

- New ISD alarm criteria based on an estimate of emission factors (winter and summer) for pressure driven emission sources.
- New ISD alarm criteria for processor performance.
- New PV valve performance standard that allows vent line emissions to be quantified.

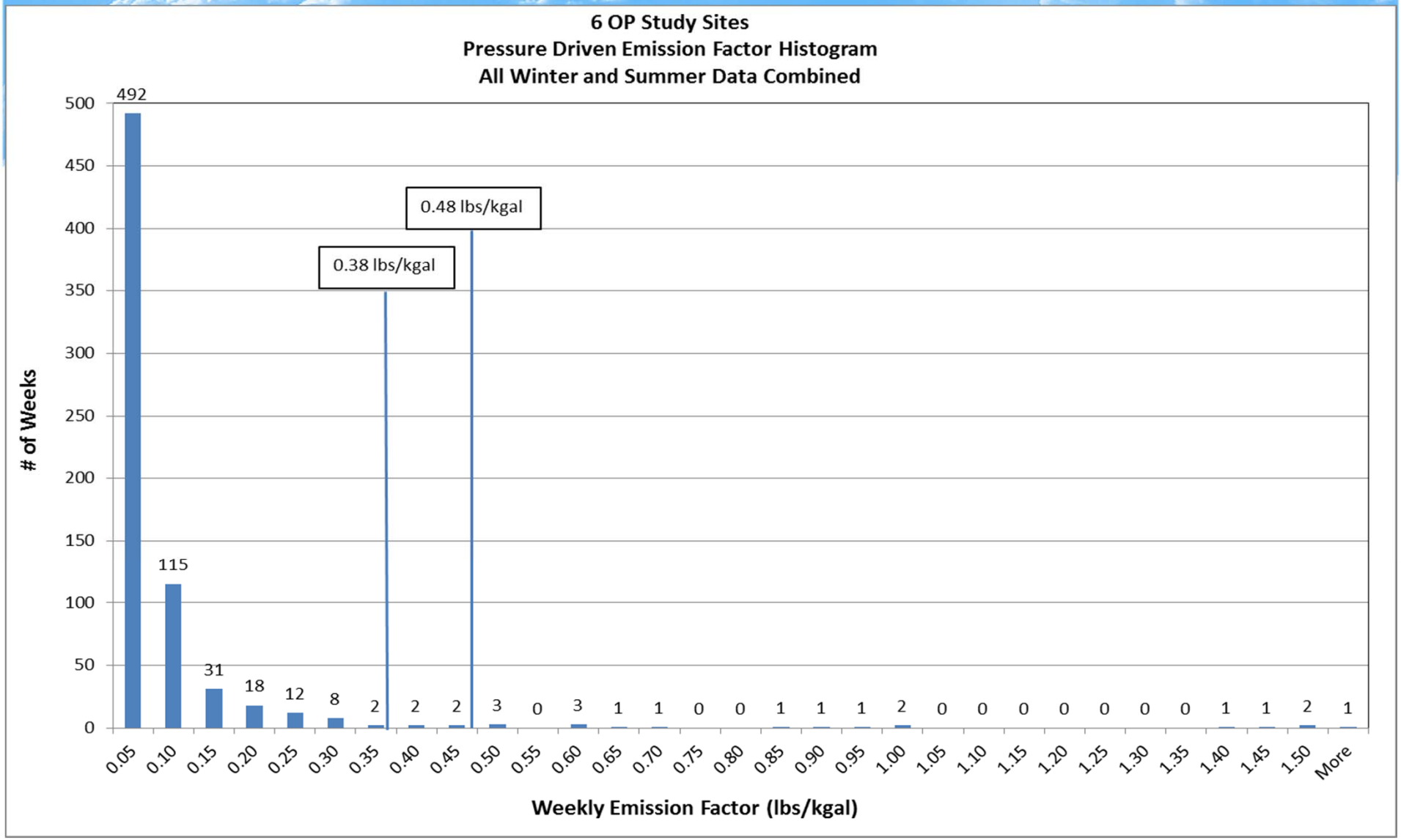
Benefits of Proposed ISD Standard

- OP alarms more likely to identify an equipment malfunction.
- >85% reduction in OP alarms.
- Reduction in OP alarm response cost.

Current vs Proposed

Assessment Period	Current ISD OP Alarm Criteria	Proposed ISD OP Alarm Criteria
Weekly Assessment	5% of pressure data above 1.5"WC (CARB CP-201 Section 9.2.4).	Pressure driven emission factor indicates 5% efficiency loss.
Monthly Assessment	25% of pressure data above 0.5"WC (CARB CP-201 Section 9.2.4).	Eliminate monthly ISD alarm criteria.
Daily Assessment (Processors Only)	Daily assessment to identify vapor processor malfunction (CARB CP-201 Section 9.2.5).	Daily assessment to identify vapor processor malfunction. Include requirement that UST pressure may not be the sole indicator of processor performance.

Proposed Alarm Criteria



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Comparison of Proposal and Existing ISD Performance Standards

Period	# of Weeks of Data	# of OP Alarms if 5% of the weekly pressure data exceeds 1.3"WC	# of OP Alarms if the weekly Emission Factor exceeds 0.48 lbs/kgal in Winter and 0.38 lbs/kgal in Summer	% Decrease in OP Alarms	% of OP Alarms with Equipment Problem when EF exceeds 0.48 lbs/kgal in Winter and 0.38 lbs/kgal in Summer
Winter (Nov 09 - Mar 10) - 6 Sites	112	31	3	90.3%	33%
Winter (Nov 10 - Mar 11) - 6 Sites	118	43	8	81.4%	100%
Winter (Nov 11 - Mar 12) - 6 Sites	129	33	4	87.9%	100%
Summer (Apr 10 - Oct 10) - 6 Sites	168	5	0	100.0%	N/A
Summer (Apr 11 - Oct 11) - 6 Sites	173	16	2	87.5%	100%
Overall - 6 Sites (Nov 09 - Mar 12)	700	128	17	86.7%	88%

*2 out of 3 alarms during Nov 09 – Mar 10 were due to extended 36 hour holiday shutdown.

Implementation of Proposal

- Existing ISD Installations – Optional to upgrade to new emission based ISD software.
- New ISD Installations – Required to install new emission based ISD software.
- After new emission based software is available, Advisory 405-B will be rescinded and all OP alarms will require a contractor response.

Estimated Costs

- Upgrade includes:
  - ISD Software and Installation
  - PV Valve and Installation
  - CUPA Permit Fees

- Estimated Costs Range from $2000 - $4000.

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