WORKSHOP TO DISCUSS PROPOSED 2014 CHANGES TO ENHANCED VAPOR RECOVERY REGULATIONS FOR GASOLINE DISPENSING FACILITIES WITH UNDERGROUND STORAGE TANKS

Public Workshop Dates:
Sacramento, CA - March 7, 2014
Diamond Bar, CA - March 14, 2014
Housekeeping

- Emergency Exits, Building Evacuation, Restrooms
- Listen Only Conference Line:
  - Phone: 888-455-9763 (Sacramento & Diamond Bar)
  - Pass Code: 2509019 (Sacramento & Diamond Bar)
- Hold questions and comments till end of each segment
- For those participating via conference call, email your comments during the presentation to glew@arb.ca.gov
- Presentation is available for viewing at http://www.arb.ca.gov/vapor/vapor.htm
Presentation Outline

• Purpose of Today’s Workshop
• 2014 Enhanced Vapor Recovery (EVR) Regulatory Proposal
  – In-Station Diagnostics (ISD) Overpressure (OP) Field Study Update
  – Second Generation ISD
  – Enhanced Conventional (ECO) Nozzle
• Next Steps
Presentation Outline

• **Purpose of Today’s Workshop**
• 2014 EVR Regulatory Proposal
  – ISD OP Field Study Update
  – Second Generation ISD
  – Enhanced Conventional Nozzle
• Next Steps
Purpose of Workshop

• Inform interested parties about proposed 2014 changes to vapor recovery program for underground storage tanks (UST)
• Provide an update pertaining to the ongoing field study on ISD overpressure alarms
• Solicit feedback on proposed changes and field study
• Our Goal: Identify and resolve any issues before presenting these amendments to our Board for adoption in November 2014
• Proposed changes to aboveground storage tank (AST) program will be discussed during a series of workshops to be scheduled in April 2014
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  – Second Generation ISD
  – Enhanced Conventional Nozzle

• Next Steps
ISD Overpressure Alarm Criteria

-1.00" wc  0.00" wc  +1.00" wc  +2.00" wc  +3.00" wc

ISD Monthly Ullage Pressure Range
(Greater than +0.3" WC for 25% of time)

ISD Weekly Ullage Pressure Range
(Greater than +1.3" WC for 5% of Time)
ISD OP Alarms

• OP alarms occur during the winter fuel season at ~50% of California Gasoline Dispensing Facilities (GDF) with ISD
• OP alarms increase with winter gasoline
• Advisory 405-B provides temporary relief by allowing GDF operators to clear OP alarms
• Information obtained in November 2012 indicated that some GDFs exhibited pressure increase while dispensing (PWD) for extended time periods
Major Elements of OP Study

• Study Sites with Continuous Data Collection
  – Estimate OP emission impact

• Vapor Recovery System (VRS) Performance Testing
  – Correlate OP alarms with equipment failures

• Reid Vapor Pressure (RVP) Sampling and Analysis
  – Correlate OP alarms with winter fuel season

• Collection of ISD Alarm History, UST Pressure Data, and VRS Configuration from ~400 Sites
  – Alarm Frequency and Data Analysis
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Study Sites with Continuous Data Collection

- Six sites in Northern California established Fall 2009
- Five sites in Southern California established Fall 2013
- RVP determined from gasoline samples collected at each site
- Each equipped with “PV Zero” Vent Valve, Barometric/UST Pressure Monitor, and an ISD Data Acquisition System
- Will be used to estimate pressure driven fugitive and vent line emissions
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Vapor Recovery System Performance Testing

- ISD Operability
- Nozzle Bag Test
- CAS Integrity
- Vapor to Liquid (V/L) Ratio
- Dispenser Integrity
- 20 Sites Targeted
- ISD Download
Major Elements of OP Study

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RVP Control Periods

Summer Control Period

- **A** April 1 – Oct 31
- **B** May 1 – Sept 30
- **C** May 1 – Oct 31
- **D** June 1 – Sep 30
- **E** June 1 – Oct 31
Southern California: RVP Data

[Graph showing data points for RVP (psi) over time, with two categories: Summer Fuel and Winter Fuel]
Major Elements of OP Study

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• Collection of ISD Alarm History, UST Pressure Data, and VRS Configuration from ~400 Sites
  – Alarm Frequency and Data Analysis
Data Collection: Sample Distribution
~400 Sites (5% sample size)

<table>
<thead>
<tr>
<th>District(s)</th>
<th>South Coast</th>
<th>Bay Area</th>
<th>San Joaquin Valley</th>
<th>San Luis Obispo North Coast Mojave El Dorado Placer</th>
<th>San Diego</th>
<th>Sacramento Yolo-Solano Feather River</th>
<th>Regions not Sampled</th>
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<tbody>
<tr>
<td>% of Statewide GDF w/ ISD</td>
<td>40.3%</td>
<td>17.1%</td>
<td>11.3%</td>
<td>11.1%</td>
<td>8.3%</td>
<td>6.9%</td>
<td>4.9%</td>
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<tr>
<td>Target Number of GDF ISD Downloads</td>
<td>136</td>
<td>58</td>
<td>38</td>
<td>37</td>
<td>28</td>
<td>23</td>
<td>0</td>
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<tr>
<td>Target Number of Assist ISD Downloads</td>
<td>93</td>
<td>36</td>
<td>25</td>
<td>26</td>
<td>NA</td>
<td>NA</td>
<td>0</td>
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<tr>
<td>Target Number of Balance ISD Downloads</td>
<td>43</td>
<td>22</td>
<td>13</td>
<td>12</td>
<td>NA</td>
<td>NA</td>
<td>0</td>
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<tr>
<td>Number of Oversampled GDF ISD Downloads</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>57</td>
<td>23</td>
<td>0</td>
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<tr>
<td>Total Downloads Per District or Multi-District Region</td>
<td>136</td>
<td>58</td>
<td>38</td>
<td>37</td>
<td>85</td>
<td>46</td>
<td>0</td>
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Northern California Sites

http://batchgeo.com/map/b4b2b1cc275f01be851858c4489a1654
Southern California Sites

http://batchgeo.com/map/cefe7c3329c4b55b8078ef69374e30f1
Data Collected From ~400 Sites

- Collaborative effort between ARB and Districts
- 14 ARB Staff Members
- 28 District Staff Members

**ISD Data**
- All alarm history data available (at least one 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 and source
- Inventory report with tank capacities
Data Collection Schedule

Oct 2013
1st ISD
Data Collection

Dec 2013
2nd ISD
Data Collection

Feb/Mar 2014
3rd ISD
Data Collection

Apr/May 2014
4th ISD
Data Collection

Nov 1, 2013
Change to Winter Fuel

Apr 1 or May 1, 2014
Change to Summer Fuel
Major Elements of OP Study

• Study Sites with Continuous Data Collection
  – Estimate OP emission impact
• Vapor Recovery System Performance Testing
  – Correlate OP alarms with equipment failures
• Reid Vapor Pressure Sampling and Analysis
  – Correlate OP alarms with winter fuel season
• Collection of ISD Alarm History, UST Pressure Data, and VRS Configuration from ~400 Sites
  – Alarm Frequency and Data Analysis
## Data Analysis

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Objective</th>
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<tbody>
<tr>
<td>~ 400 Sites</td>
<td>Determine the percentage of sites that exhibit pressure increase while dispensing (PWD) on a regional and statewide basis.</td>
</tr>
<tr>
<td></td>
<td>Perform analysis on ISD alarm history, fuel source, temperature, and GDF operating characteristics to identify trends and correlations on a regional and statewide basis.</td>
</tr>
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</table>
### Prevalence of OP Alarms:

<table>
<thead>
<tr>
<th>Data Set</th>
<th>OP Alarms</th>
<th>October 2013</th>
<th>November 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Sites Combined</strong></td>
<td>Average Number of Alarms Per Site</td>
<td>0.12</td>
<td>1.39</td>
</tr>
<tr>
<td></td>
<td>% of Sites With at Least One Alarm</td>
<td>6.6%</td>
<td>54.4%</td>
</tr>
<tr>
<td><strong>Assist Sites</strong></td>
<td>Average Number of Alarms Per Site</td>
<td>0.16</td>
<td>1.84</td>
</tr>
<tr>
<td>(274)</td>
<td>% of Sites With at Least One Alarm</td>
<td>8.8%</td>
<td>69.7%</td>
</tr>
<tr>
<td><strong>Balance Sites</strong></td>
<td>Average Number of Alarms Per Site</td>
<td>0.02</td>
<td>0.36</td>
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<tr>
<td>(121)</td>
<td>% of Sites With at Least One Alarm</td>
<td>1.7%</td>
<td>19.8%</td>
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</table>
Prevalence of OP Alarms:

Oct 2011 - Nov 2013

Prevalence of OP Alarms - 395 Sites in CA
## Prevalence of Leak Alarms

<table>
<thead>
<tr>
<th>Data Set</th>
<th>Leak Alarms</th>
<th>October 2013</th>
<th>November 2013</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All Sites Combined</strong></td>
<td>Average Number of Alarms Per Site</td>
<td>0.33</td>
<td>0.29</td>
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<tr>
<td>(395)</td>
<td>% of Sites With at Least One Alarm</td>
<td>16.2%</td>
<td>16.2%</td>
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<tr>
<td><strong>Assist Sites</strong></td>
<td>Average Number of Alarms Per Site</td>
<td>0.19</td>
<td>0.13</td>
</tr>
<tr>
<td>(274)</td>
<td>% of Sites With at Least One Alarm</td>
<td>11.7%</td>
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</tr>
<tr>
<td><strong>Balance Sites</strong></td>
<td>Average Number of Alarms Per Site</td>
<td>0.65</td>
<td>0.65</td>
</tr>
<tr>
<td>(121)</td>
<td>% of Sites With at Least One Alarm</td>
<td>26.4%</td>
<td>33.1%</td>
</tr>
</tbody>
</table>
Prevalence of Leak Alarms

Oct 2011 - Nov 2013
Prevalence of Leak Alarms - 395 Sites in CA
Prevalence of PWD (Dec 2013)

• Percentage of sites that exhibit PWD on a statewide basis: 24%
• Percentage of Healy (assist) equipped sites that exhibit PWD on a statewide basis: 34%
• Percentage of balance equipped sites that exhibit PWD on a statewide basis: < 1%
Prevalence of PWD Balance vs Assist

• Rate of gasoline evaporation in the UST is affected by gasoline RVP, gasoline temperature, and the volume of vapor returned from older vehicles without On-board Refueling Vapor Recovery (ORVR)

• Composition of gasoline delivered to GDFs equipped with balance systems and assist systems should be the same

• Ratio of ORVR equipped vehicles refueling at GDFs equipped with balance systems vs assist systems should be the same

• Evaporation rate for both systems should be the same
Observations: Assist System

• During the winter fuel season, vapors generated by evaporation are pressurizing the UST and being emitted to the atmosphere through fugitive leaks and vent line emissions.

<table>
<thead>
<tr>
<th>Figure</th>
<th>Emission Point</th>
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<tbody>
<tr>
<td>1</td>
<td>Nozzle</td>
</tr>
<tr>
<td>2</td>
<td>Vapor Return</td>
</tr>
<tr>
<td>3</td>
<td>PV Vent</td>
</tr>
<tr>
<td>4</td>
<td>Processor</td>
</tr>
<tr>
<td>5</td>
<td>Fugitives</td>
</tr>
</tbody>
</table>
South Coast Assist Site Pressure Comparison October and December
Observations: Balance System

- Much lower incidence of overpressure alarms and PWD than assist systems
- Higher incidence of leak alarms than assist systems
- Assuming that both systems experience similar gasoline evaporation rates it is reasonable to conclude that vapors must be exiting the balance system by means other than fugitive and vent line emissions
South Coast Balance Site Pressure Comparison October and December

Chart showing pressure and ullage over time for October and December.
Balance System: Further Study Needed

• Identify the process that allows vapor to exit the balance system and determine whether or not these vapors are entering the atmosphere

• Methodology under consideration:
  – Conduct source testing to determine if vapors are being emitted at the nozzle - fill pipe interface during the fueling of ORVR vehicles when UST pressure is near zero
  – Evaluate carbon canister operation and UST pressure to estimate the volume of vapors exiting the UST through the vapor processor
OP: Next Steps

• Complete “Round III” and “Round IV” of field data collection from ~400 sites

• Perform analysis to identify correlations and trends

• Reconcile ARB findings with other data sources

• Determine emission impact

• Propose a solution and evaluate alternative solutions
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• Next Steps
What Is In-Station Diagnostics?

ISD monitors vapor recovery system and alerts GDF owners/operators of failures.
Second Generation ISD

• Regulatory structure:
  – Included with ISD OP proposal
  – Required for new installations
  – Optional for existing installations

• Goals of second generation ISD:
  – Better identify equipment problems or issues
  – Reduce compliance costs

• Concepts under consideration:
  – Additional Functionality
  – Technical Improvements
Second Generation ISD:

Additional Functionality

- **Compliance mode**
  - Reduce costs associated with manual compliance testing
- **Remote access for regulators**
  - Reduce the frequency of manual compliance testing
- **Repair verification**
  - Verify proper repair before alarm can be cleared
- **Detect idle flow**
  - Pinpoint leaks in hanging hardware and dispenser plumbing
Second Generation ISD:
Technical Improvements

• Report format and content

• USB port for direct connection

• Standardize ISD Assessment Periods
  Rolling or Fixed Calendar Time Frame?

• Unique user password for alarm clearing
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• **2014 EVR Regulatory Proposal**
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  – **Enhanced Conventional (ECO) Nozzle**
• Next Steps
ECO Nozzle Proposal
-Purpose-

• A new emission reduction strategy for facilities fueling predominately vehicles with on-board refueling vapor recovery (ORVR) systems
• New standards would provide emission reductions and in some instances cost savings
• Other states have expressed interest in California’s proposed ECO nozzle regulations
ECO Nozzle
- Proposed Performance Standards-

<table>
<thead>
<tr>
<th>Performance Type</th>
<th>Requirement</th>
<th>Test Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nozzle Spillage*</td>
<td>≤ 0.24 pounds/1,000 gallons</td>
<td>TP-201.2C</td>
</tr>
<tr>
<td>Post-Refueling Drips</td>
<td>≤ 3 Drops per Refueling</td>
<td>TP-201.2D</td>
</tr>
<tr>
<td>Liquid Retention</td>
<td>≤ 100 mL per 1,000 gallons</td>
<td>TP-201.2E</td>
</tr>
<tr>
<td>Nozzle Spitting</td>
<td>≤ 1.0 mL / nozzle / fueling</td>
<td>TP-201.2E</td>
</tr>
</tbody>
</table>

* 60% reduction in liquid spills when converting from conventional nozzle to ECO nozzle
ECO Nozzle
-Proposed Regulation-

• Draft text of proposed ECO nozzle regulatory language will be available for public comments sometime this Spring
  – Draft Certification Procedure 207
  – Draft cost effectiveness report

• ARB will collaborate with the districts to establish applicability criteria for the ECO nozzle standard
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Next Steps

• Complete Field Data Collection
• Conduct Additional Public Workshops in June
  – Results of OP field study
  – Proposed regulatory language
  – Preliminary environmental and economic analysis
• Release Rulemaking Documents in October
  – Technical Support Document
  – Staff Report
  – Economic Analysis
Rulemaking Timeline

Three Public Workshops
Sept 2013 – June 2014

Informal Process
Discuss research activities, field studies and findings

Present concepts and draft regulatory language

Solicit and consider stakeholder feedbacks on concepts and draft language

45-day Comment Period
For Rulemaking
Oct – Nov 2014

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

Board Hearing
Nov 2014

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
Your Comments and Suggestions Are Welcome
Please submit them by April 1, 2014

<table>
<thead>
<tr>
<th>Project Component</th>
<th>Staff</th>
<th>Contact Info</th>
</tr>
</thead>
<tbody>
<tr>
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<td>(916) 322-8949 <a href="mailto:sbacon@arb.ca.gov">sbacon@arb.ca.gov</a></td>
</tr>
<tr>
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<td>Paul Marzilli</td>
<td>(916) 445-7431 <a href="mailto:pmarzill@arb.ca.gov">pmarzill@arb.ca.gov</a></td>
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<td>(916) 323-6752 <a href="mailto:jmarconi@arb.ca.gov">jmarconi@arb.ca.gov</a></td>
</tr>
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<td>Lou Dinkler</td>
<td>(916) 324-9487 <a href="mailto:ldinkler@arb.ca.gov">ldinkler@arb.ca.gov</a></td>
</tr>
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