Using Your Personal H_2S Alarm Devices to Improve Industrial Hygiene

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Marathon

Agenda

- Recent history of H_2S Monitoring within Marathon
- Review of recent H_2S Alarm data trends from two refineries
- Review of recent Engineering and Administrative Improvements

History

- Pre-1998: H_2S monitors selectively distributed by Operations Supervision
- 2003: All refining personnel and contractors required to wear an H_2S monitor
- 2008: Change in the Corporate H_2S Standard; All affected employees were required to wear a calibrated or operationally verified, personal H_2S monitor
- 2008-2009: Effort begins to track calibration or operation verification records as well as reported and unreported H_2S alarm events

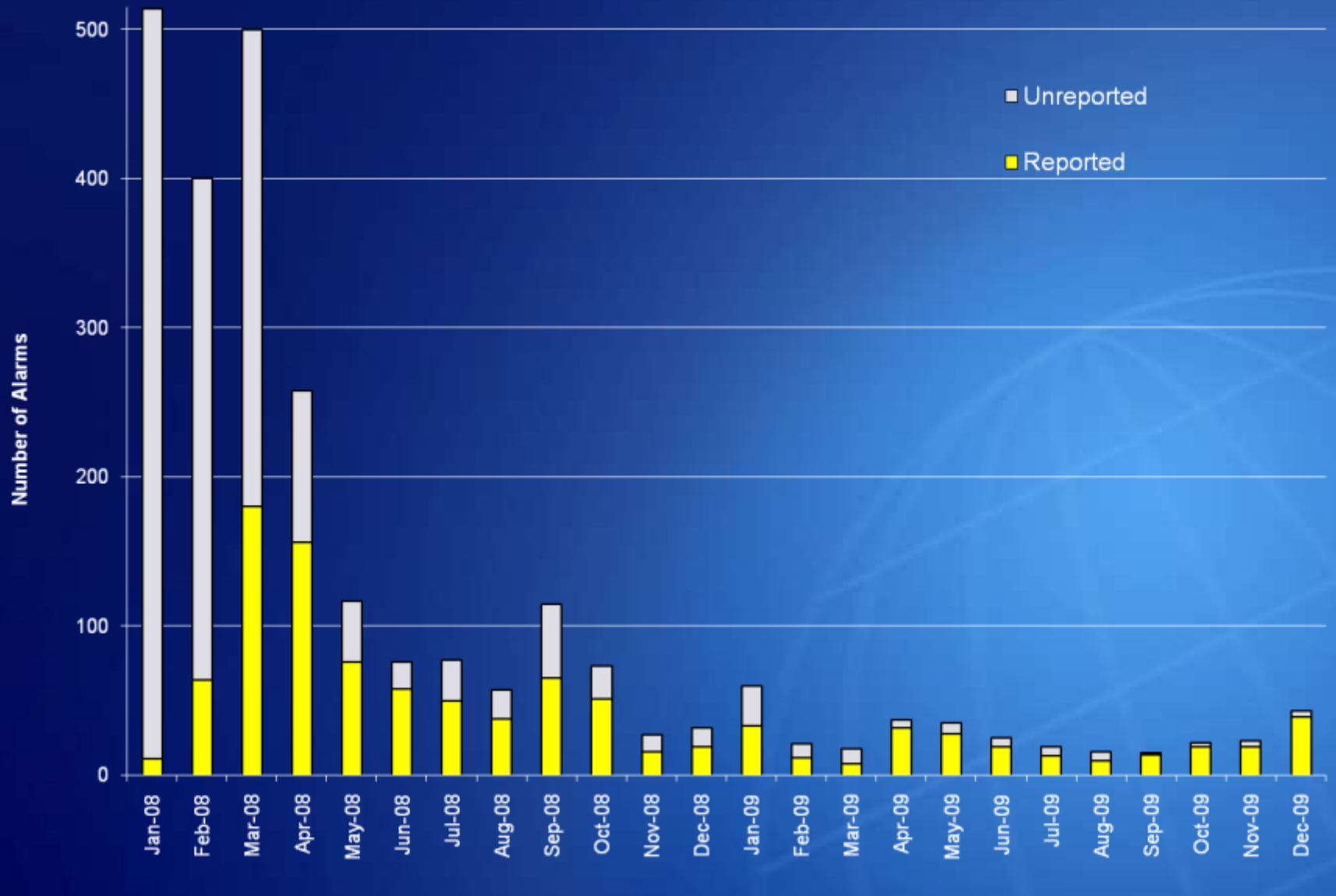
2008 H_2S Monitoring Objectives

- 100% Calibration or Operationally verified
- 100% Alarm Reporting
  - Alarm when wearing respiratory protection
  - Alarm between 10ppm-49.9ppm
  - Alarm greater than or equal to 50ppm, without respiratory protection
- Reduce H_2S Exposures
  - Implement Engineering controls
  - Implement Administrative & PPE Controls

Refinery Example #1

- Heavy sour crude slate
- Extract 1200 – 1400 tons of molten sulfur per day

H_2S Alarm Events 2008-2009



Sulfur Loading Rack Concern

- Drivers equipped with supplied air respiratory protection
- Concerns
  - Data indicated potential for > 100 ppm H_2S on rack platform
  - Frequent personal H_2S monitor alarms on ground during loading
  - Interim LEV system problems due to clogging as result of hose type/length

Sulfur Loading Rack Problem Mitigation

- Drivers must still wear supplied air respirator while on truck
- Solutions
  - Smooth 6” piping to eductor
  - smooth 4” flexible hose on arm
  - Daily steaming of eductors and periodic “whack” to intake with mallet prevents clogging

Closed-Loop/Closed & Remote Vent Sample Stations

- 3 Year (2008 – 2010) Project to install throughout refinery
- Prioritization of Sample Station Upgrade based on alarm history
  - **Install temporary LEV**
  - **Liquid sample stations –**
    - **fixed volume/closed-loop/remote vent liquid sample stations.**
  - **Gas sample stations/test points –**
    - **closed-loop/remote vent sample stations/Drager tube test points**

Temporary Local Exhaust Systems

- Sour Water Storage Tank Oil/Water Interface Level

- Sour Water Sample Station LEV

- Amine Sample Station LEV

Desalter Interface Level Local Exhaust

- Demonstration of effectiveness of LEV

- Desalter LEV

Portable Local Exhaust & Dilution Ventilation

- Stand mounted eductor used to capture/dilute and redirect
  - 2 – 5 in each Operating Area

    - Supply 1200 cfm with 70 psi plant air

    - Used to dilute emissions from leaking equipment, bleeders, etc.

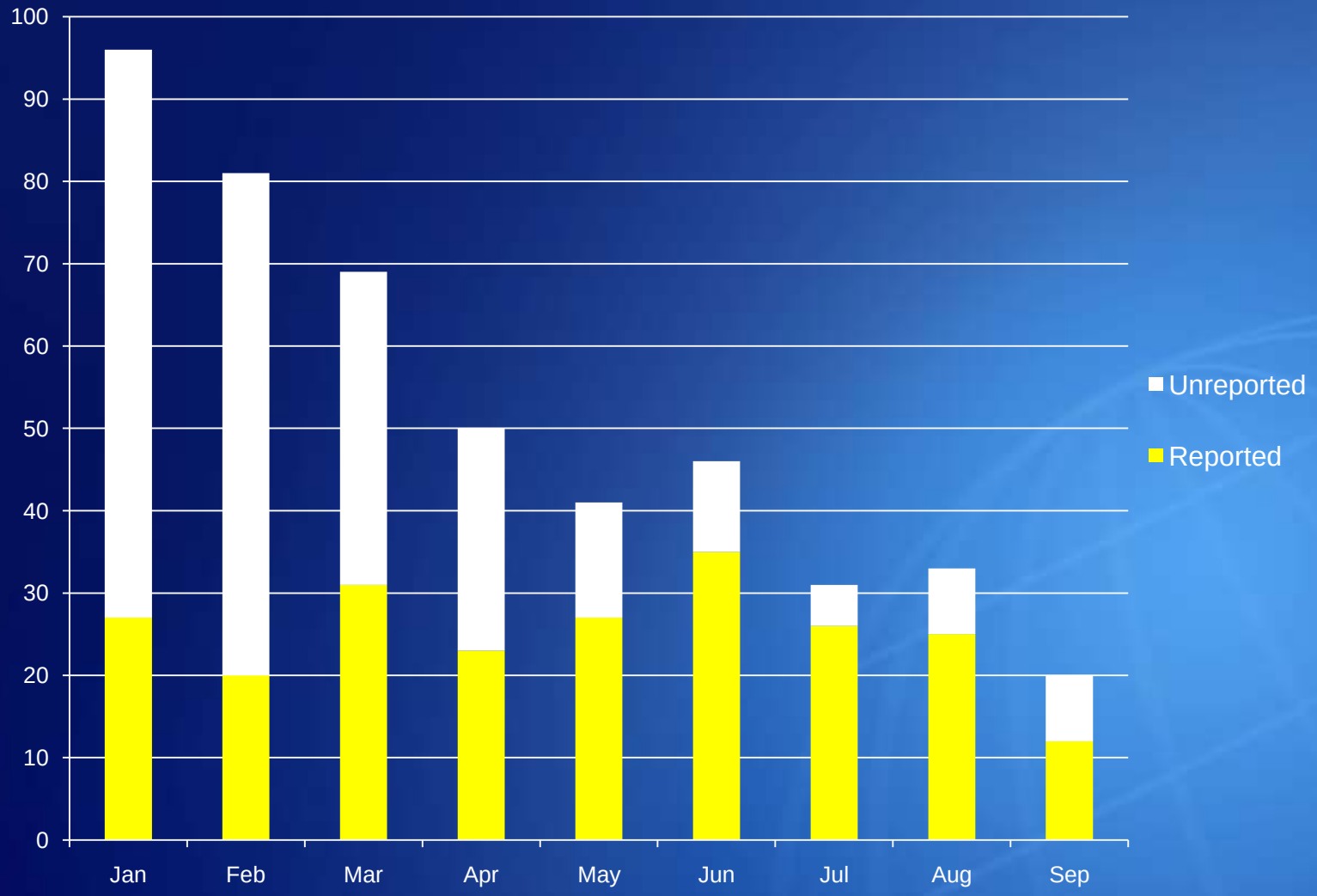
- LEV Applications

    - Capture emissions from leaking equipment, bleeders, sewers

Refinery Example #2

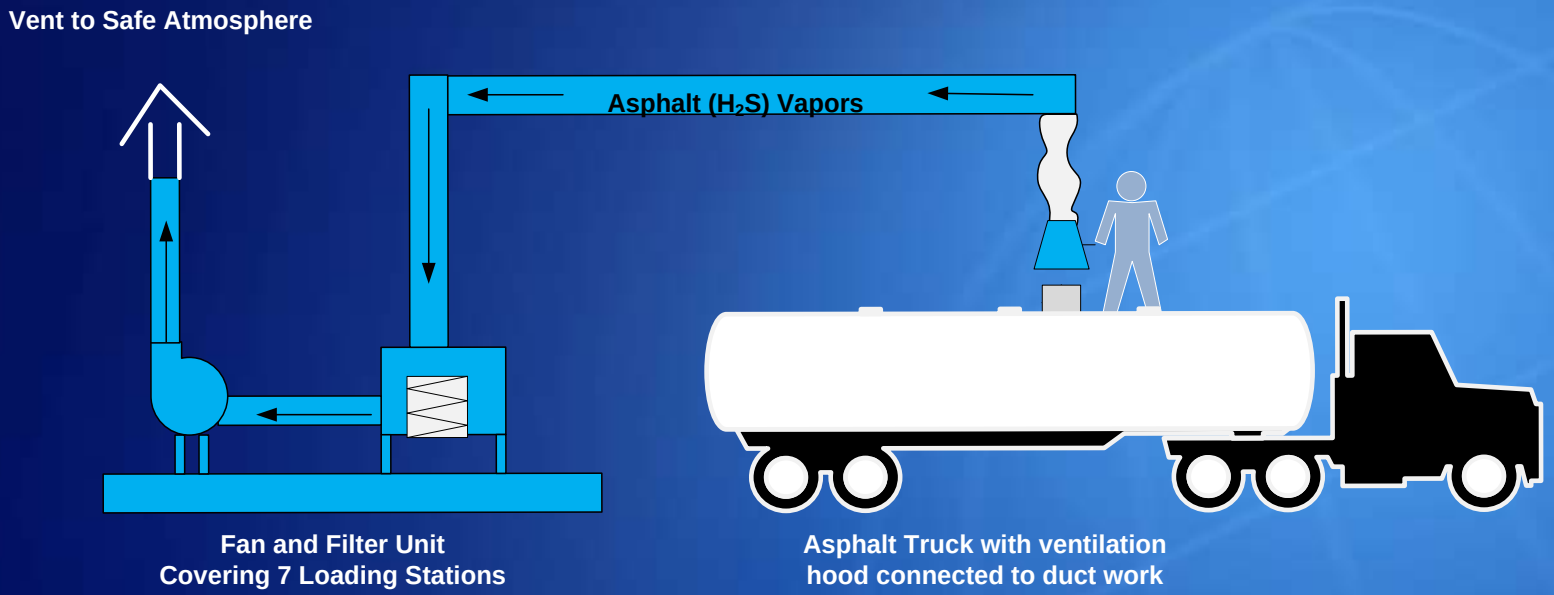
- Canadian & domestic crude

Number of H2S Alarm Events (2009)



Asphalt Truck Rack & Rail Ventilation

- New ventilation system for 7 truck loading docks
- Ventilation installed at Asphalt Rail Loading



Closed Loop Sample Stations

- Multi-Year Upgrade Project
- Wild & Un-stabilized Naphtha or Distillate Overhead Liquids
- Consider Use of Bombs for Liquids

Sulfur Pit Improvements

- Contracted engineering firm specializing in sulfur systems
- Lid penetrations were reworked and grouted
- Eductor suction lines were replaced
- Insulated and steam-jacketed cold sections of piping to prevent plugging

Reduction of Sour Water Draining to Sewer

- Unit Knockout Drums
- Compressor Knockout Drums
- Water Boots

Sulfur Loading Stations

- Vacuum ventilation system installed at rail and truck loading stations
- Eliminate need for respiratory protection

Refinery Example #3

- Capacity 102,000 barrels per day

Sulfur Loading

- Ventilation was installed at the sulfur truck loading rack and asphalt railcar loading rack

Administrative Controls

- H_2S Mitigation Team Implemented
  - Quarterly newsletter sent to employees
- Risk Matrix
  - Used to prioritize sample stations upgrades

FREQUENCY							
	WEEKLY	5	C	C	B	A	A
	MONTHLY	4	D	C	B	A	A
	BI-ANNUAL	3	D	D	C	B	B
	YEARLY	2	D	D	C	C	C
	>YEARLY	1	D	D	D	C	C
			1	2	3	4	5
	SAMPLING RISK		No Exposure, Stream is below exposure limit	Sample Station Controlled Volume Vent to Controlled Location	Sample Station Controlled Volume No Vent	Sample Station No Controlled Volume No Vent	Draeger Tube or Open Container
	DRAINING RISK		No Exposure, Stream is below exposure limit	Closed Drain <= 3 min Vac Truck Used	Closed Drain >3min Vac Truck Used	Open Drain <= 3 min	Open Drain >3min
			Stream < PEL	**Stream > PEL**			
			OPPORUNITY OF EXPOSURE				

Marathon Pipe Line

- 10,000 miles of pipeline delivering more than 11 million gallons per day of crude oil and petroleum products
- 71 pipeline systems in 16 sates and federal waters

Closed Crude Sample Pot Cleaning

- Solvent is pumped directly into sample pots
- Eliminates the need for opening a sample pot to clean between batch runs

Local Exhaust Ventilation Upgrades

- Ventilation Upgrades in Sample Buildings / Cut Shacks

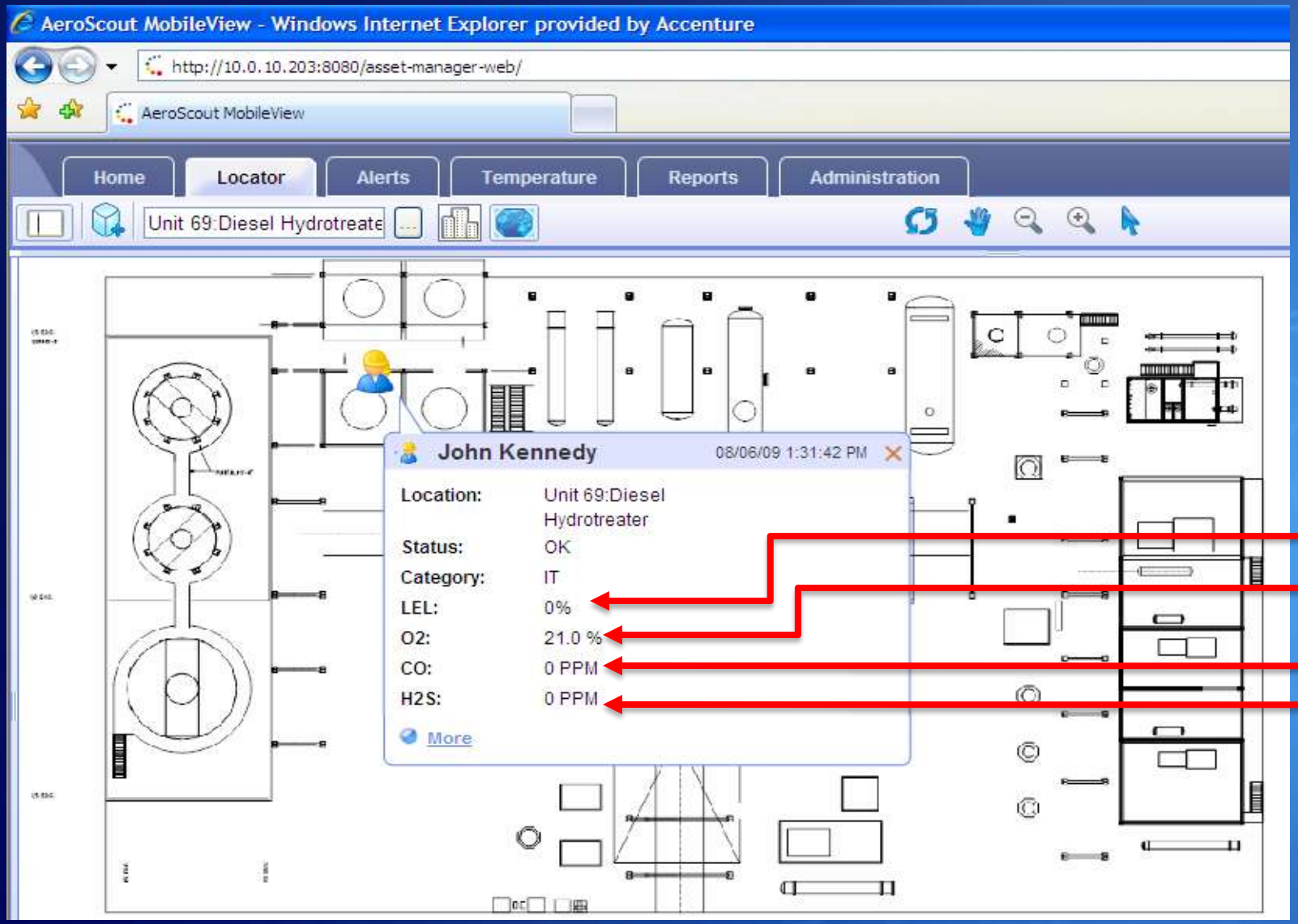
Next Generation Gas Management

- Even though significant progress has been made with H_2S awareness and associated work processes, Marathon is looking for ways to further enhance gas management
- What opportunities still exist?
  - Gas information is only available locally to the individual or when the detector is docked
  - If an individual is exposed to high levels of gas, others need to know in case assistance is required
  - The location of the individual is not available when help may be needed
  - Ability to quickly deploy air monitoring devices during incidents that continuously provide data

How is Marathon addressing opportunities?

- Marathon is partnering with a consultant to develop a multi-gas monitoring solution
- What does it do and how does this solution work?
  - Utilizes a wireless four gas detector
  - Gas and location information is sent wirelessly back to the control room
  - High gas levels are alarmed at the control board
  - Real time visibility of individuals in the unit at all times
  - Utilizes a wireless infrastructure in the refinery covering where anyone could walk

Gas levels available real time



In Conclusion:
What gets measured gets results

- Metric that all business units are tracking
- Management is paying closer attention
- Safety devices have helped with reducing Industrial Hygiene exposures to H_2S

Questions?

Contributions:

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