



2011 Sensor Workshop Background & Objectives



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H2Incidents.org: Search 'sensor'

Hydrogen Explosion in University Biochemistry Laboratory

Exterior windows were blown out, resulting in four injured researchers and significant damage. The laboratory had previously used hydrogen and oxygen sensors however, the atmosphere proved corrosive, which led to an inaccurate sensor readout that resulted in a dangerous gas mixture in the chamber.

Intentional Hydrogen Release Causes Unintentional Hydrogen Alarm

A vehicle hydrogen tank needed to be de-fueled, but standard operating procedure could not be followed and had to be manually vented with a special tool. This intentional release was done outside an R&D facility, but it unintentionally activated two sensors in vehicle bay (at 20% LFL).

Battery Room Explosion

A hydrogen explosion occurred in a UPS battery room. Hydrogen safety sensors were in alarm upon emergency responders arriving at the scene, it was reported that alarm was sounding for 3 days prior to the explosion.

Hydrogen Leakage from Ground Packing of Flow Control Valve

A hydrogen fueling station safety sensor detected a slight leakage from the ground packing of the flow control valve during refueling. The refueling operation was stopped until valve repairs could be completed.

H2Incidents data supplied by PNNL

Battery Room Explosion



Sensor Technology



Workshop Objectives

- Revisit 2007 workshop
- Breakouts: Application specific
 - Requirements
 - Issues/Experience
 - Define gaps: needs vs. technology readiness
 - Identify R&D opportunities
 - Develop/Revise DOE sensor targets
- Discuss lessons learned
- Measure progress since 2007
- Provide networking opportunities

Breakout Checklist

HYDROGEN SENSOR WORKSHOP

June 8th, 2011 • Chicago, IL



BREAKOUT CHECKLIST:

NOTES:

ANALYTICAL CHARACTERISTICS

- Selectivity
- Lower Detection Limit
- Analytical Resolution
- Linear Range (and Dynamic Range)
- Response Time
- Recovery Time
- Repeatability
- Signal Drift
- Environmental Effects (e.g., P, T, and RH)
- Reversibility
- Limits of Quantization (Limits of determination)
- Saturation Stability
- Sensitivity (slope of calibration curve)

DEPLOYMENT PARAMETERS

- Capital Cost
- Installation Costs, Location
- Physical Size, Control Circuitry
- Power Requirement
- Electronic Interface
- Pneumatic Connections
- Shelf life, Maturity/availability
- Government Regulations (Codes)

OPERATIONAL PARAMETERS

- Operational Lifetime
- Consumables
- Calibration and Maintenance Requirements [frequency and complexity]
- Sample size
- Matrix requirements
- Signal Management
- Orientation Effect
- Device to device Repeatability
- Warm Up Time
- Alarm Set Points

GAPS & BARRIERS

- Experience
- Field History
- Development Timeline
- Consumer Issues
- Commercialization
- Codes and Standards

R&D NEEDS

- Analysis
- Testing
- Verification
- Certification
- Collaborations
- Resources
- Priorities

ACTION ITEMS FOR THIS SESSION _____