Agenda

• Customer Overview
• Project Overview
• Equipment Deployment Examples
• Lessons Learned
• Questions
Site

- 14,000 acre located 17 mi. southeast of Chicago, IL
  - facility first opened in 1889
  - Key anchor of the northwest Indiana economy
Recent Major Projects

• 2013 Remodernization Project Increased Capacity to 430,000 BPD
  • $400 mil
• Recent Projects
  • $180 mil Flare Gas Recovery
  • $235 mil Water Treatment Unit
Gas Detection at the Refinery

• Personal H2S & SO2 Monitoring
  • 6000 Tango TX1
  • 58 Docking Stations

• Multigas Program
  • 300-400 Competitive Monitors
  • 4-gas
  • 4-gas + SO2
  • PID
Midwest Refinery

PROJECT OVERVIEW - NAPHTHA HYDROTREATER PROJECT
Naphtha Hydrotreater
Project Scope

- 85,000 barrels per day (BPD) Naphtha Hydrotreater (NHT) that will be used to remove sulfur from existing gasoline blending streams
- NHT will produce 5 ppm sulfur gasoline at the battery limit so that the gasoline pool can be 8 ppm (Sulfur maximum).
Project Hazards

• Potential toxic/explosive gas emitted from adjacent units
  – The project has active units on all sides
• Confined Space Entry
• Non-Gas Hazards
  – Heart Attacks, Heat Exhaustion, etc.
• Currently in the excavation stage of the project
Technologies Deployed

- Peer-to-Peer is sharing real-time data and alarm events between monitors without the need for a device to read it locally or remotely

<table>
<thead>
<tr>
<th>Applications</th>
<th>Type</th>
<th>Description</th>
<th>Product</th>
<th>Protocol</th>
</tr>
</thead>
<tbody>
<tr>
<td>User and Site Assignment</td>
<td>NFC</td>
<td>Enables two devices to exchange encrypted data over short distances.</td>
<td>Ventis Pro</td>
<td></td>
</tr>
<tr>
<td>Automatic Site Assignment and Proximity Alarms</td>
<td>BLE</td>
<td>Used to communicate between devices within a short range (5-100m) and doesn’t require Line of Sight</td>
<td>Ventis Pro w/Assign Beacon</td>
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<td>Lone Worker Live Monitoring</td>
<td></td>
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<tr>
<td>Peer-to-Peer Live Monitoring</td>
<td>LENS</td>
<td>Mesh network that focuses on the peer-to-peer level and uses frequency hopping to find the best path of transmission.</td>
<td>Ventis Pro and Radius with LENS</td>
<td></td>
</tr>
<tr>
<td>Plant-wide gas monitoring</td>
<td>Wi-Fi</td>
<td>Wi-Fi local area networks (WLANs) Trademark name for IEEE 802.11.</td>
<td>Ventis LS (used in ALSS)</td>
<td></td>
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</table>
Instruments Used for this application

Radius BZ1 with SafeCore Area Monitor, LEL (Pentane) CO, H2S, O2, With Integral Pump, UL/CSA, LENS™ Wireless, English

Ventis Pro 5 Series Multi-Gas Monitor, LEL (Pentane), CO, H2S, O2, Lithium-ion Battery, High-Visibility Orange, UL/CSA, LENS™ Wireless, English
iAssign™ Technology

Sticker Tag

Keychain Tag

Waterproof Sticker Tag

Outdoor Tag

Android App

Read Tag

Write Tag

Buy Tags

Write Bulk
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EQUIPMENT DEPLOYMENT EXAMPLES
Hot Work at Elevated and/or Multiple Levels

Dedicated Fire Watch positioned at grade while Crafts are performing hot work on elevated structure.

One or several Area Monitors (Radius BZ1) are placed at grade with dedicated fire watch upwind of Hot Work.

Personal Monitors (Ventis Pro5) worn by crafts performing Hot Work will be peered with the Area Monitors (Radius BZ1).
Excavation Confined Space Entry with or without Hot Work

Area Monitor (Radius BZ1) placed with Confined space attendant/fire watch.

Personal Monitor (Ventis Pro5) worn by confined space entrants will be peered with Radius BZ1.

If the Radius BZ1 is used with an extended hose to monitor confined space, the confined space attendant will also wear a peered Ventis Pro5.

If the Radius BZ1 is not used to monitor the confined space, then the confined space attendant will use an Altair monitor with extended hose to monitor the confined space.

Radius BZ1 range = 1,000 ft (unobstructed)
Ventis Pro5 range = ~325 ft (unobstructed)
Pair up to 25 monitors in a group
Signal hop up to 5 times (max 5,000 ft)
Confined Space Vessel Entry

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Confined Space Vessel Entry with Multiple Internal Levels

When working at multiple levels, crafts can use an Area Monitor (Radius BZ1) at lower levels in a vessel in addition to their personal Monitor (Ventis Pro5), all of which are paired to the Radius BZ1 located outside with the confined space attendant.

This practice would ensure peer monitor communication in the event of communication interference from vessel wall thickness and interior structures that may separate the levels in a tall vessel.

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Commissioning/Start-up of Operation Systems during Final Construction

While commissioning or starting up of Operations systems, there may be crafts finishing up items such as insulating and painting.

Area Monitors (Radius BZ1) can be placed between the commissioning/start up area and the construction work being performed.

The Personal Monitors (Ventis Pro5) can be paired with the Radius BZ1.
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LESSONS LEARNED
Lessons Learned

• Order of pairing is important
• Understanding who is entering and leaving worksite is important
• LENS signal strength is not based on how close each instrument is to each other, but also how many instruments are part of the workgroup