leak detection
lessons learned

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leak detection and repair

outline

• Our experiences
• What we have learned
• How can we improve regulatory and voluntary programs
our experiences: technology flexibility is best

Hand-held sniffers
Advantages: low cost, are easier to use and quantify the size of the leak
Disadvantages: can be more labor intensive and cannot characterize the flow of the leak

Optical gas imagers
Advantages: can survey a greater number of components in a shorter period of time
Disadvantages: high cost, require highly trained operators and cannot quantify the size of the leak or characterize the flow of the leak

Emerging technologies
Advantages: better, faster, cheaper, constant monitoring, quantification, wide area coverage
Disadvantages: we don’t know if they work yet
our experiences: what should be surveyed?

A risk-based approach leads to the most efficient program

Our data indicates:

• Wellpads with few moving parts (no compressor) leak very infrequently
  – A post-commissioning survey once in the site’s life is likely sufficient.
• Sites with rotating parts (compressors) are a more likely source of leaks, but still infrequent
  – Recommend annual surveys at sites with compressors (including tank vapor recovery units)
  – Flexible methods
our experiences: our leak rates

Repeated surveys
- After first year, number of components leaking settles at roughly 0.05%*
  - Same percentage found leaking with OGI and hand-held sniffer
  - Findings consistent in old and newer operating areas
  - Findings consistent in gas and oil operations

Initial surveys slightly higher
- In the first year, percent of components leaking can be closer to 0.15%

Component leak rate after repeated surveys

*leak as defined by the regulatory or voluntary program
what we have learned

Risk based approach is most cost effective
Survey the equipment that is likely to leak
Rotating equipment is most likely to leak
Survey sites with compressors
OGI and hand-held sniffers have pros and cons
Be technology neutral
There are promising new technologies
Keep the door open to new methods
Percent of components leaking are already very small
Survey frequency should be risk and performance based
Conclusion

**LDAR is a powerful tool**
It can help us identify leaks and fix them, but can also be very expensive and inefficient if not flexibly applied.

**There is no one size fits all program**
Frequency, instrument type and scope of program should be based on the risk of leaks.

**Future tools hold great promise**
Several field testing programs underway supported by industry, government and NGOs.