Chevron's experience with Directed Inspection & Maintenance (D I & M) to minimize Methane Releases From Offshore Platforms

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Methods and Tools used to detect and estimate releases of gas volumes from vent/flare and lease use gas (blanket gas) systems

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Tools:

- **FLIR GasFindIR camera**
- **VPAC (Physical Acoustics Corporation) volume estimating tool and software**
- **FCI thermal mass portable gas meter**
- **Ultraprobe Model 2000 ultrasonic leak detector**

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GasFindIR survey of facility performed by technician to reveal any leaks to atmosphere and/or internal leaks across closed valves. The temperature differences across closed valves can often be detected with use of the camera.

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Make repairs and or adjustments to any equipment allowing gas to escape to atmosphere

Equipment Examples:

- hoses on compressors
- compressor valve caps
- vent/flare valves
- blanket gas inlet and outlet regulators

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Use VPAC to estimate through-valve leakage based on measurements made using a Physical Acoustics Model 5131 portable monitor together with data on valve size, type, and differential pressure.

The system detects leaks across valves and determines an estimated rate of leakage. Prioritize leaks to fix

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Valves Typically Inspected include:

- Pressure Safety Valves
- Blow Down Valves
- Shut Down Valves
- Recycle Valves
- Surge Valves
- Make-up Valves
- Well Header Valves
- Back-Pressure Valves

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VPAC – Physical Acoustics

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VPAC Analysis Process:

Take readings upstream and downstream of valve; and on valve body

If readings on valve are above that of the upstream and the downstream readings, leakage is probable. Enter decibel level in the software

The software estimates the leakage rate depending on decibel level, pressure differential across valve, and valve size.

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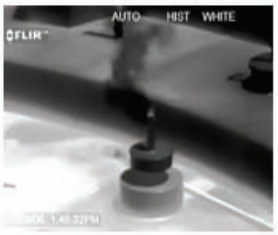
ThermaCAM® GasFindIR

The following images illustrate the camera in action.



The first image *(left)* is a natural color view of a vacuum breaker vent on top of an external floating roof tank. Note that there are no vapors visible from the vent. The second image *(right)* is one frame from a video taken with the camera. Note that hydrocarbon vapors are clearly visible as a grey/black plume. The plume is actually easier to see in the video because of the plume movement.

Tank Vent Video

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FCI – Thermal Mass Flow Meter

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1. Using VPAC and/or portable Thermal Mass meter, technician would estimate a base theoretical vent/flare volume from a platform (an "if" you had a meter on all outlets, here is an estimated spot rate volume)
2. Technician would then work with Operators to make adjustments to blanket gas and/or any leaking equipment to decrease vent/flare and fuel/lease gas use volumes
3. Technician would perform a final platform review to establish improvement and to also let Operations know what items still need attention

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Questions?

