

Ecotec case study

Archrock use Ecotec systems for measurement & management of methane leaks

Challenge

Archrock has adopted the Ecotec system for direct measurement and traceable data handling of methane leaks, saving millions of dollars in lost gas and equipment maintenance. This approach was initially prompted by Environmental, Social and Governance (ESG) concerns, driven by investors, such as BlackRock, who are accountable for emissions from their investments. Already keen to know whether the company had an emissions problem, Archrock is an operator required by the USA Inflation Reduction Act (IRA) of 2022 to reduce emissions.



A provision of the IRA is the Methane Emissions Reduction Program (MERP), designed to cut methane from oil and gas operations through a fee on wasteful emissions, as identified through modelling. Key to MERP is a charge on methane emissions from US oil and gas facilities across much of the supply chain. The charge starts in 2024 at \$900/ton of methane, increasing to \$1500 by 2026. Operators are therefore strongly incentivised to reduce emissions – by detecting and repairing leaks – to avoid the charge, as well as saving valuable gas resource which may be leaking from sites.

Ecotec was approached by Archrock because the company wanted to tackle potential methane leaks using direct measurement – rather than modelling or Artificial Intelligence (AI) – and because Ecotec could offer a complete ecosystem. Sensitive and reliable laser-based sensor equipment is integrated with fully traceable data management, to provide an end-to-end solution. Archrock invited Ecotec onto

site to review their approach, which promised to be compatible with Archrock's NIQ objectives (Notify, Identify, Quantify).

Solution

Initially Ecotec installed Gazpods on a site fence line, using a unique vertical sampling technique to ensure that any fugitive methane, in a plume from a leak, would be detected and recorded. The Gazpod uses a proven laser sensor which can detect any elevations in methane in the air around the site and units are usually installed up-wind and down-wind of the site. Once the Gazpod "gets a hit" – data is transmitted to a cloud server from which alerts can be set up with exceedance thresholds – the leak can be quickly tracked down using hand-held equipment.

The Gazoscan is a hand-held laser 'gun', which can detect low levels of methane at a distance of over 300 feet. On-screen readings and audible alerts are used to quickly narrow down the likely area of a methane leak. The Inspectra then uses similar technology to quantify methane, as sampled through a hand-held wand, which can be used to 'sniff' around infrastructure, such as flanges, joints...



The laser sensor is totally selective to methane (no false alarms from other hydrocarbons) and sensitive to 0.5ppm. Archrock had considered other equipment but there were problems, from the initial ground-level fence line monitors failing to detect methane plumes passing overhead – or requiring many more instruments to do so – to lack of sensitivity to detect methane which is heavily diluted in ambient air.

Archrock's gas compression sites can have up to 15 compressors, each handling one million cubic feet of methane per day. Compression may be to 1,200 PSI or to 3,000 PSI on Liquefied Natural Gas (LNG) plants. Gazpods have been installed on both types of site. If elevated methane is reported by the Gazpod, a Gazoscan survey is carried out, to detect which compressor is causing the issue. Ecotec staff have measured gas flow and methane % by volume to calculate the value of methane being lost in Mbtu. This baselining exercise can quantify the value of lost product and two compressors were found to have lost \$150/year in leaked methane.

Clearly such large figures can be compared directly to the cost of the Leak Detection and Repair (LDAR) programme but there is more: tracking down methane leaks is money well spent to maintain

assets. Detection of a leak at an early stage can help an operator predict catastrophic engine failure, such as caused by a leaking head gasket. Undetected, this could lead to upwards of \$500,000 in unplanned maintenance, including preventable damage to equipment, high payments for emergency response teams and operation downtime, leading to lost revenue.

Outcome

To achieve the best chance of detecting leaking methane, a single Gazpod unit can be set up to sample from up to eight different points. Ecotec is currently using this approach on Archrock sites, putting probes into engine exhausts. Monitoring methane at these multiple sampling points can measure methane slip and also provide insight into the health of the engine. This strategy has been used for decades by Ecotec on landfill flares, so techniques for managing hot, wet gases have been fine-tuned. Competent gas conditioning means that damaging gas condensate is dealt with effectively, and sensor equipment maintenance needs minimised (the laser sensors only require calibration every two years). As well as predicting the most urgent LDAR cases, Ecotec's system can be used to 'keep an eye on' compressors or engines which do not need to be taken down immediately, balancing the need to repair leaks with the cost of unplanned maintenance.

Some of Archrock's sites are enclosed, to protect equipment and workers in colder areas. Staff are required by law to use Lower Explosive Limit (LEL) monitors, but by the time methane has reached 5%, there is clearly a very large problem. Ecotec has overcome this challenge by using the multi-sample Gazpod to detect deviations from the established indoor background methane level, which may be in the region of 200-300ppm. Sampling points are installed at even intervals along the inside of the roof of these huge aluminium barns, which means that an increase in methane can be narrowed down to at least a quadrant of the enclosure, from which it can be pinpointed and quantified using the Gazoscan and Inspectra.

Ecotec's system can be purchased outright, but Archrock prefers to use a 'monitoring as a service' approach, paying a monthly charge for use of equipment and data services. This cost compares favourably with the costs that it can prevent, particularly downtime. Archrock is currently rolling out the Ecotec system across its sites, knowing the investment will be more than paid back by savings in MERP charges, lost product and maintenance costs.

Archrock is an energy infrastructure company with a primary focus on midstream natural gas compression and a commitment to helping its customers produce, compress and transport natural gas



in a safe and environmentally responsible way. Headquartered in Houston, Texas, Archrock is the leading provider of natural gas compression services to customers in the energy industry throughout the U.S. and a leading supplier of aftermarket services to customers that own compression equipment.

Ecotec specializes in high-precision hardware and integrated software for greenhouse gas monitoring and measurement, providing auditable reporting for safe, sustainable operations. The Ecotec Group includes specialist sensor system manufacture and cloud-based data management in USA, UK and Europe, with headquarters in California.