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WELLHEAD EMISSIONS MANAGEMENT SYSTEMS

WELLHEAD EMISSIONS MANAGEMENT SYSTEMS

Steve Smith, CEO

Tommy Denney, Vice President Operations

Mission/Company Goals

- Start-up focused on the reduction/elimination of VOC emissions from upstream wellheads
- Founded in late 2015
- Focus on novel yet simple technologies pioneered in the downstream environment. Provisional U.S. Patent Application No. 62/413,859 filed for well head emissions mitigation system
- Previous downstream experience developing solutions for Clients who had to comply TCEQ Regulation 115 to monitor and reduce highly reactive volatile organic carbon emissions from cooling towers, flares and pressure relief valves

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Value Proposition

- The Emissions PRO System will allow for End Users 100% mitigation of their VOC emissions sources using a variety of conversion or scrubber technologies
- The Emissions Pro System will provide the ability to “Live” data-stream VOC readings and operating parameters from each site for emissions report generation. These reports will be automated and can be provided to the Regulatory Agency to prove compliance with the EPA Fugitive Emissions Rules
- Maintenance can be “Proactively” rather than “Reactively” scheduled on the production equipment

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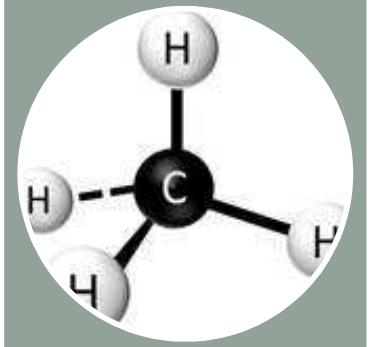
Technology Overview



Eliminate methane emissions regulations

Reduce cost estimates for compliance from EPA by 30%

Remove headaches with tracking/reporting

Eliminate downtime/lost production for leak repairs

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Overview

As the rules are currently proposed, the upstream fugitive emissions strategy will be the same as has been done for decades in the downstream market, as required by the Leak Detection And Repair (LDAR) program.

Clients will outsource to testing companies the sources which have to be tested and if a leak is found, then the Stake Holder will have to commit the time and funds to make the required repairs. In some instances, this may be a simple task. In many others, especially with older equipment, this could present a major issue.

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Overview

Current LDAR Requirements - For each regulated process:

- Maintain a list of all ID numbers for all equipment subject to an equipment leak regulation.
- For valves designated as “unsafe to monitor,” maintain a list of ID numbers and an explanation/review of conditions for the designation.
- Maintain detailed schematics, equipment design specifications (including dates and descriptions of any changes), and piping and instrumentation diagrams.
- Maintain the results of performance testing and leak detection monitoring, including leak monitoring results per the leak frequency, monitoring leak less equipment, and non-periodic event monitoring.

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Overview

For leaking equipment:

- Attach ID tags to the equipment.
- Maintain records of the equipment ID number, the instrument and operator ID numbers, and the date the leak was detected.
- Maintain a list of the dates of each repair attempt and an explanation of the attempted repair method.
- Note the dates of successful repairs.
- Include the results of monitoring tests to determine if the repair was successful.
- Method 21 requires VOC emissions from regulated components to be measured in parts per million (ppm).
- A leak is detected whenever the measured concentration exceeds the threshold standard (i.e., leak definition) for the applicable regulation. – Leak definitions vary by regulation, component type, service (e.g., light liquid, heavy liquid, gas/vapor), and monitoring interval. – Most NSPS have a leak definition of 10,000 ppm. Many NESHAP use a 500-ppm or 1,000-ppm leak definition.

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Overview

To stop detected leaks while they are still small, most rules require a first attempt at repair within 5 days of the leak detection and a final repair within 15 days.

However, any component that cannot be repaired within those time frames must be placed on a “Delay of Repair” list to be repaired during the next shutdown cycle.

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Overview

Common Problems

- Not keeping detailed and accurate records required by the applicable regulation.
- Not updating records to designate new components that are subject to LDAR due to revised regulations or process modifications.

Best Practices

- Perform internal and third-party audits of LDAR records on a regular basis to ensure compliance.
- Electronically monitor and store LDAR data including regular QA/QC audits.
- Perform regular records maintenance.
- Continually search for and update regulatory requirements.
- Properly record and report first attempts at repair.
- Keep the proper records for components on Delay of Repair lists.

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Overview

Our approach is radically different from what has been done in the past to reduce fugitive emissions.

The Emissions Pro System is designed for:

1. Free flowing wells
2. Artificial lifts
3. Capped and abandoned leaking wells
4. Process equipment that cannot be repaired in the required 15 days

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Compliance Cost

Estimates for the cost to comply with these regulations vary. What is assured is that all of these estimates are incorrect.

1. EPA estimated cost of compliance (implementation of LDAR cost only) is > $3,000 per well per year
2. An industry gas consortium estimates compliance cost will be 0.65 cents per 1,000 SCF of gas produced or 4 times the cost estimated by the EPA
3. Individuals operating small groups of stripper wells have indicated that cost of compliance will result in bankrupting this market segment, due to the age of the equipment. This equipment simply cannot be repaired at any cost.

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Expected Leak Rates

During Method 21 testing conducted by Wellhead Emissions on older free flowing production wells in Texas:

1. Leaks of 100ppm were prolific. Methane emissions were calculated to be 114# per year per well
2. Leaks ≥10,000 ppm were common. At this leak rate, Methane emissions were calculated to be ≥ 1,100# per year per well

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Technology Overview

For artificial lifts and affected free flowing production wells, our approach is the Emissions PRO Containment and Mitigation System.

The implementation of our system is simple, cost effective with the end result being zero organic carbon emissions from the well sites. No need to halt production for costly repairs. When repairs are needed, these can be done on your schedule and not on the EPA's mandated schedule.

The system offered will be provided in several different configurations. Most systems will require a power source, which can either be traditional land line power (110VAC) or solar power. For small flow rate leaks, a passive absorption system will be offered.

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Technology Overview – Production Wells

For the production wellhead, the Emissions PRO System will consist of a containment tent along with the required VOC and containment system monitoring hardware. Mitigation of the VOC's is done with either the Emissions PRO Catalytic Converter, Emissions PRO Telsa Converter or the Emissions PRO VOC Scrubber.

The actual configuration of the containment system is determined by the location of the source, ambient conditions and the expected concentration of the leak as determined during the baseline monitoring test program.

Wells with excessive emissions will use either the catalytic or Telsa converter. Wells with smaller emissions concentrations will utilize an absorber bed.

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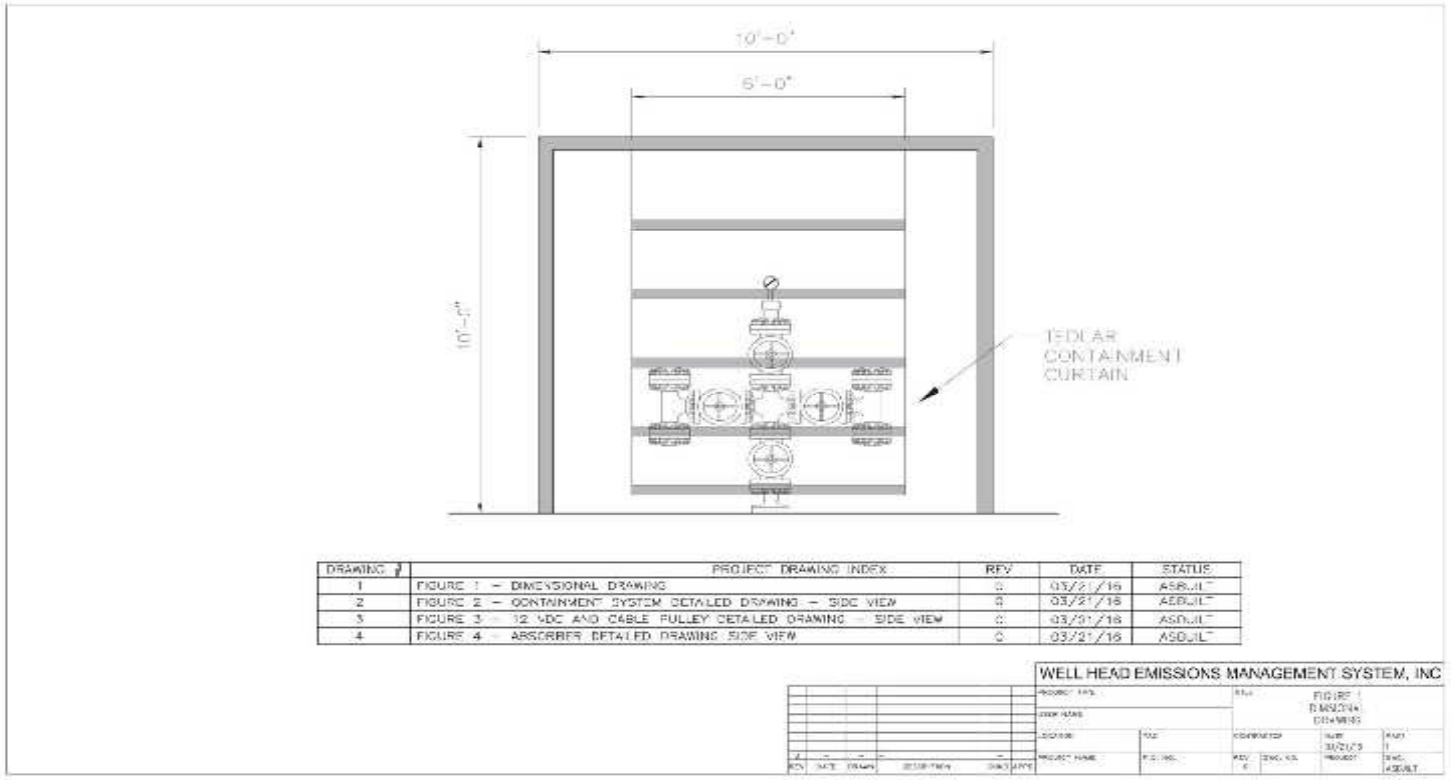
Technology Overview – Production Wells



DRAWING #	PROJECT DRAWING INDEX	REV	DATE	STATUS
1	FIGURE 1 – DIMENSIONAL DRAWING	0	03/21/16	ASBUILT
2	FIGURE 2 – CONTAINMENT SYSTEM DETAILED DRAWING – SIDE VIEW	0	03/21/16	ASBUILT
3	FIGURE 3 – 12 VDC AND CABLE PULLEY DETAILED DRAWING – SIDE VIEW	0	03/21/16	ASBUILT
4	FIGURE 4 – ABSORBER DETAILED DRAWING SIDE VIEW	0	03/21/16	ASBUILT

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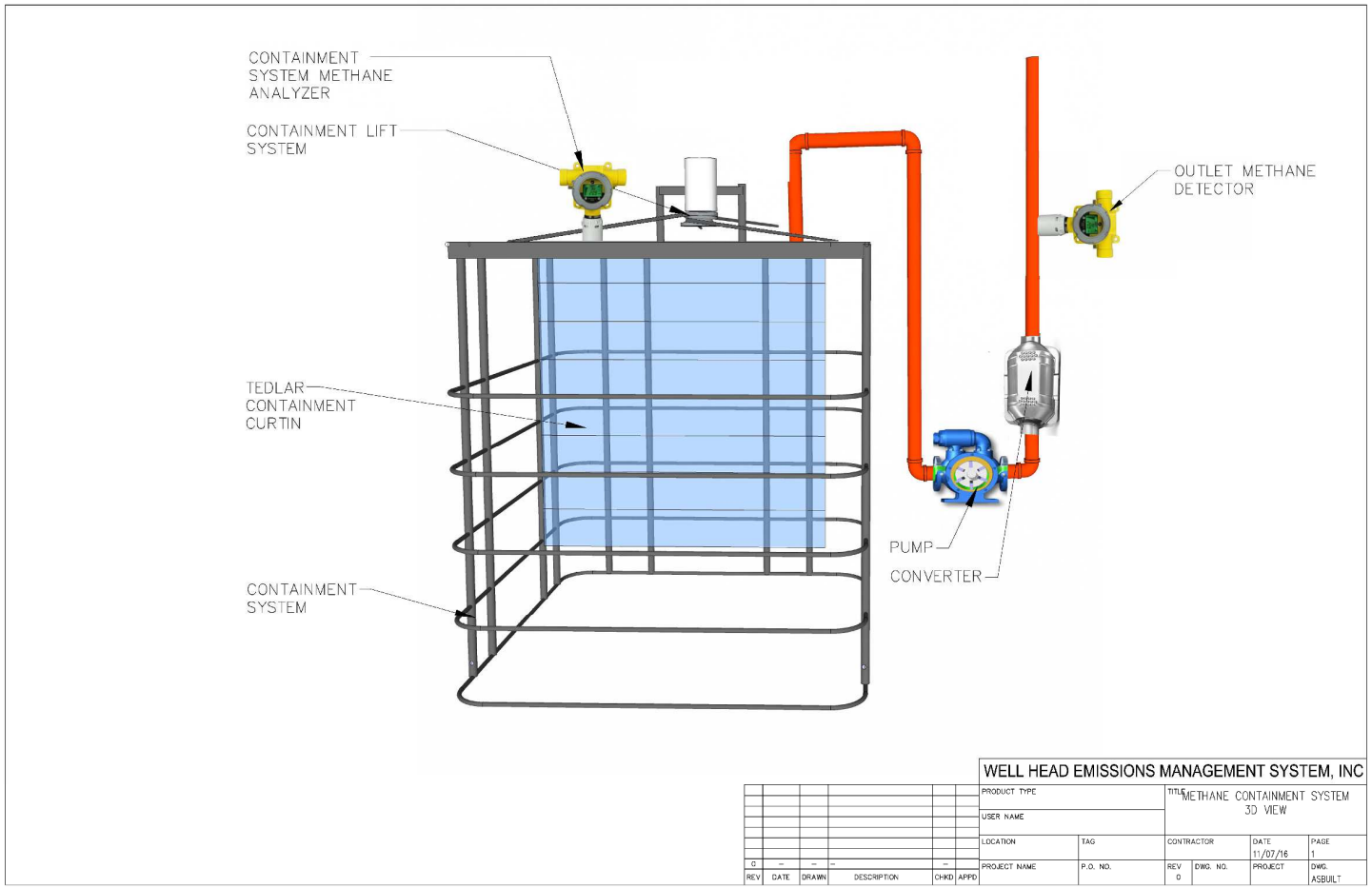
Technology Overview – Production Wells



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Technology Overview – Artificial Lifts

For the artificial lift, the Emissions PRO System consists of a hard-case containment system along with the required VOC and containment system monitoring hardware. As with the production well systems, mitigation of the VOC's is done with either the Emissions PRO Catalytic Converter, Emissions PRO Telsa Converter or the Emissions PRO VOC Scrubber.

The actual configuration of the containment system is determined by the location of the source, ambient conditions and the expected concentration of the leak as determined during the baseline monitoring test program.

Lifts with excessive emissions will use either the catalytic or Telsa converter. Lifts with smaller emissions concentrations will use the scrubber.

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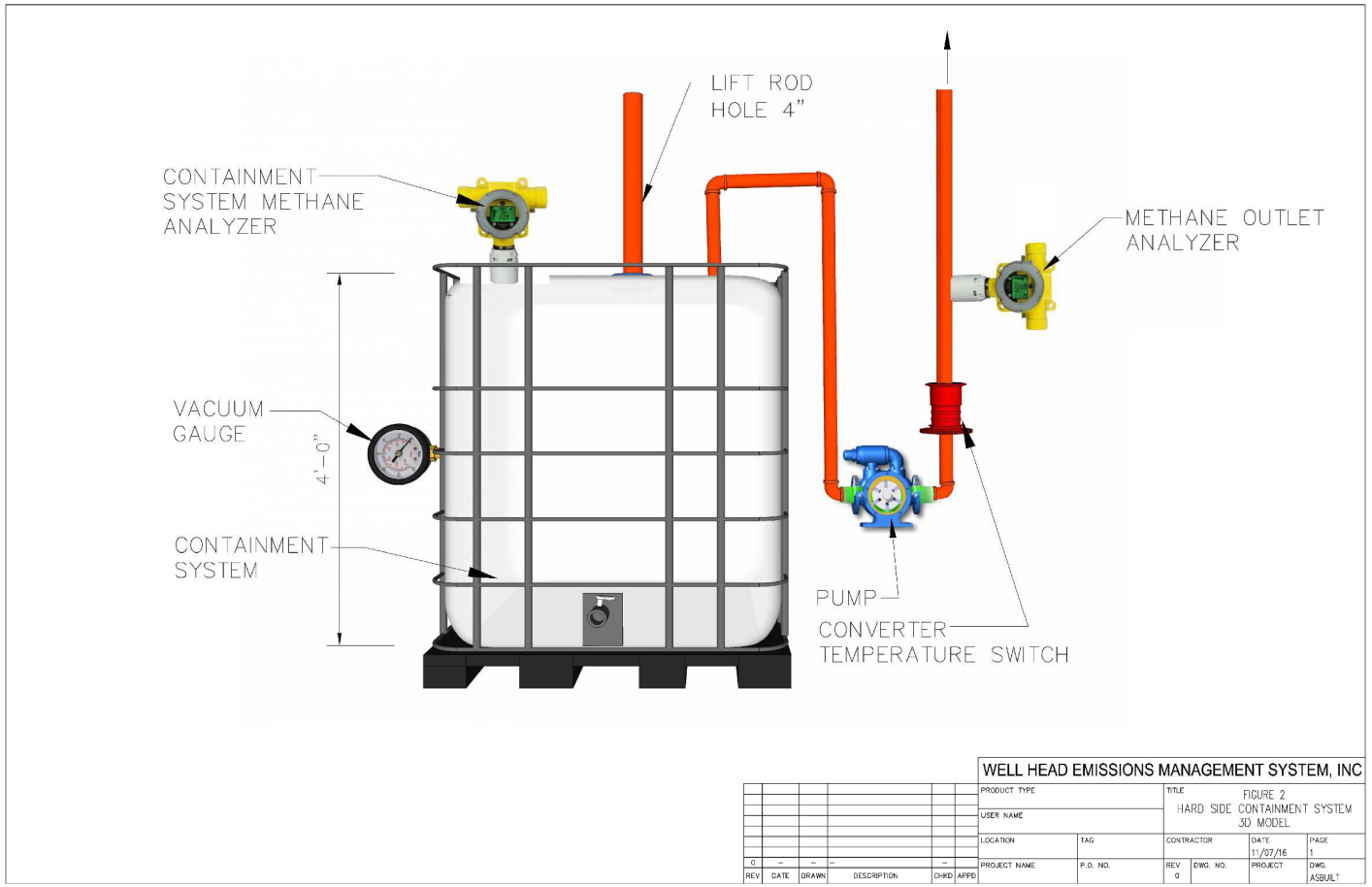
Technology Overview – Artificial Lifts



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Technology Overview – Artificial Lifts

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Technology Overview – Emissions Report

The Emissions PRO Report will provided proof to the Regulatory Agency that the fugitive emissions are being mitigated at each location.

The report will include the following:

1. VOC concentration inside the containment system
2. VOC concentration at the outlet of the conversion hardware
3. VOC Conversion Efficiency
4. 1 Hour VOC Emissions Average from each source
5. 24 Hour VOC Emissions Average from each source
6. Monthly VOC Emissions Average from each source
7. Quarterly VOC Emissions Average from each source
8. Containment System Differential Pressure reading. The Emissions PRO System makes its claim of zero VOC emissions by conversion or scrubbing of the fugitive emissions collected in a system operating at less than atmospheric pressure

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Questions?

Thanks for Your Time and Attention

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