Alberta Innovates/ Husky CHOPS Methane Challenge

Husky Energy Feedback from April 4th 2018 Applicant Webinar

- Desired volumetric capacity (cubic meters/day)
  - Not exactly sure which is stream 1 vs. 2 (assume one is casing and other is tank vent). For tank vent, the ideal range would be from 0-500 m^3/day (ideally would be able to distinguish between gas and water vapour). For casing/wellhead vent, the range would be 0-1500/2000 m^3/day (wouldn't be measuring volumes >500 m^3/day long term, but need to see what the volumes could be to size vent reduction equipment). If one stream is the total casing production volume, then that range would be 0-3500 m^3/day.
- How much electric power is available from engine on site?
  - Our typical engine alternator generates 100 amps of 12V power. Typical wellsite equipment will consume ~45 amps. Therefore, we'd have ~50 amps of 12V power available for measurement.
- Calibration requirements (I answered as little as possible)
  - Calibration frequency shall be dictated by Directive 017 and other applicable standards (ie: API, manufacturer's recommendation where applicable). Method of calibration must also meet standards, but the easiest and least disruptive (ie: on site verification of transmitter is ideal) is the best. Cost should be in the hundreds of dollars, not thousands.
- Data capture & analysis: what parameters are desired
  - As a minimum, a totalized volume (m^3) would be required. If possible, connectivity to onsite RTU/PLC would be a bonus (ie: Modbus, pulse, etc.). If connectivity is possible, a yesterday volume (previous day's 24 hour volume in m^3) and instantaneous flow rate (m^3/day) would be beneficial (typical poll time is 15 minute intervals).
- Duty cycle of measurements
  - Desired service life of the device would be >5 years.
- Gas rates
  - See comments above in volumetric capacity question.
- Oil rates
  - In theory, the casing gas (GOR factor) and tank vent (GIS rate) volumes are a direct correlation to oil production. As both of these gas volumes are ratios of m^3 of gas/m^3 of oil, it is somewhat relevant. However, real world volumes that we are looking at measuring may not be quite as linear as the ratios indicate. The gas rates mentioned above have already factored in the expected oil production. For information sake, typical wells range from 0.5 – 40 m^3/day of oil (majority would be <15 m^3/day of oil).
- Gas pressure at various rates
  - Both potential measurement locations:

    Tank vent: virtually 0 kPag since it is an atmospheric vent.

    Casing vent: 0-103 kPag since it is an atmospheric vent but there is likely going to be a bit more back pressure. Casing production: 0-3500 kPag (meter needs to be capable of handling full 300 ANSI pressure of 4960 kPag).
- Exact spacing parameters of the wellsite (plot plan)
  - Wellhead to engine shack spacing is 6m. Wellhead to production tank is 6m. The meter spacing will be dictated by the electrical code's area classifications. I believe the engine shack is considered a general area, but there are vents on the side of the building which could factor into the spacing of the meter. See above for a sample plot plan showing a typical lease set up.
- Ideal cost of solution
  - Stream 1: $5,000 for a full installation (meter, piping, electrical/instrumentation) would be an ideal upper limit (meter cost <$1000 would be ideal). Unless the full installation is <$10,000, then it doesn't really gain anything over what we might have today for the cheapest option available.