Landfill Gas Header: Location and Benefits

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Lessons learned from previously constructed gas collection and control systems teach solid waste professionals valuable lessons about designing for long-term survivability and reducing the maintenance cost of

Figure 1
Construction of gas header, gas condensate sump, condensate force main, and compressed air lines in landfill perimeter berm.

gas system components. The location impacts operating and maintenance costs for various components of gas collection and control systems such as condensate force main, condensate sumps, force main for well liquids, air lines to pumps in gas wells, and gas headers long into the future. As often as possible, design the gas header in the landfill perimeter berm along with the condensate sumps. Landfill perimeter berms constructed in an engineered manner with well-compacted soils and a well-defined geometry provide a long-term cost-effective alternative to earlier designs outside the berm.

For many years, gas headers were designed and constructed outside of the landfill perimeter berm, on the landfill surface. Of course, landfill surface changes as waste elevation increases over time, resulting in many gas headers that now may be 30 feet or more below the current waste surface. Deeply buried gas headers are unreliable at best, and the operator loses access to them as soon as 20 feet of waste covers the header.

Collapsed gas headers buried deep in waste are an expensive challenge when operating a large number of gas wells connected to the gas header and could cause serious compliance issues. Upon discovery of a collapsed buried gas header, installing a new header is a lengthy process with significant costs, not to mention the hurdles the operator will have to jump addressing noncompliance with their state agency.

The benefits of placing gas headers in the landfill perimeter are:

- Constructing gas headers once without the need to be re-constructed again at a high cost;

Figure 2
Gas condensate sump at completion of perimeter berm.

- Constructing condensate sumps in line with the gas header in the landfill perimeter berm, provide technicians quick access for maintenance;
- Avoiding ground settlement around condensate sumps;
- Avoiding sagging of the gas header over time due to settlement;
- The slope of the gas header toward the condensate sumps in perimeter berms is much less than those on the landfill slope;
- There is little surcharge loading on the gas header, thereby no crushing of the pipe; and
- The gas header is accessible for any additional connections if required in the future.

Since the condensate force main follows the gas header in the perimeter berm to flow to a tank or discharge point, there are additional maintenance benefits:

- Electrical lines to electric pumps or compressed air lines to air

pumps in condensate sumps are located in the landfill perimeter berm;
- Cleanouts to the condensate force main are built along the perimeter berm and accessible for maintenance;
- Flow meters, air release valves, and sampling points on the condensate force main are constructed at necessary spots along the landfill perimeter berm and easily accessible to technicians;
- Stub outs on the gas header are constructed at locations specified in the design plans along the landfill perimeter berm for connecting the gas header to vacuum lines extending up the landfill slope; and
- Compressed air lines to air pumps in gas wells are constructed in the landfill perimeter berm with stub outs for extensions on to the landfill slopes and to the wells.

By continuing to design gas header construction on landfill slopes, all of the components end up on the landfill slope as well. You can imagine what type of complications the landfill operator will face since all of these components are in areas vulnerable to erosion, settlement, future filling, or future construction. Additionally, any maintenance requiring digging and re-piping necessitates placing equipment on the landfill slope and disturbing the landfill slope surface for an extended period.

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