7. Landfill Biogas Blower Systems

7.a System Description

As noted in previous sections, landfill biogas is transported from the landfill wellfield to the blower facility by way of the main gas collection header. LFG then typically passes through a liquid knockout vessel for the removal of gas particles and liquid, before being routed to the blower. Block valve and bypass valves may be actively used at some landfills if there is a desire to route gas around the liquid knockout vessel. This is generally not recommended because condensate removal helps to protect processing instrumentation and equipment.

The blower facility and associated control equipment can either be housed inside a building or be exposed to the elements outside. See ***Exhibit 7-1***. It should be centrally located with room for expansion and supplied power. It should also have the capacity to handle 100 percent of the LFG peak production estimate, plus additional size for LFG migration control. Butterfly valves are often installed on the inlet and outlet piping for each blower being used to allow for continuous blower operation during scheduled maintenance and shutdowns.

EXHIBIT 7-1: TYPICAL BLOWER FACILITY

The purpose of the LFG blower (also known as a compressor) is to create a vacuum for the extraction of gas from collection wells and trenches under pressure, the pulling of the LFG to the blower, and the pushing of the LFG to the flare or other treatment equipment. This process is known as actively controlling LFG, which contrasts with passive LFG control (i.e., LFG is allowed to move without any mechanical assistance). Passive systems, where LFG is typically allowed to vent into the atmosphere with little

or no treatment (i.e., treatment options might include removal of VOCs using granular activated carbon and flaring at vent wells), most often are not advocated for modern landfill operations.

The start-up procedure associated with the blower system will vary depending upon the design of individual facility. Landfill operators should follow the recommended procedure of the blower system manufacturer.

7.b Typical Components

The primary mechanical component of the blower system is the gas compressor or blower itself. Other associated equipment may include:

- Valves (automatic block, check)
- Flow metering and recording
- Gages to measure pressure, temperature, etc.
- Condensate treatment and handling equipment
- Electrical equipment
- Instrumentation
- Utilities.

Selection of the appropriate blower is determined by such factors as the quantity and end use of the LFG, the vacuum required to extract the gas, the pressure required for processing, etc. The main types of blowers used for LFG applications include:

- Single- and multi-stage centrifugal blowers (i.e., constant vacuum/pressure, variable gas volume machines, incorporating a butterfly valve at the unit inlet)

- Positive displacement lobe blowers (i.e., constant volume, variable pressure machines, where volume is varied only by a speed change of the rotating lobe)

7.c Data Measurements

Operators should bear in mind that blowers compress LFG, typically in the 10 to 100 inches water column of total pressure or head. The vacuum created by the blower is

impacted by the number of wells and will typically range between 15 and 85 inches w.c. of vacuum. Depending upon the operating gas flow and flare burner design, the discharge pressure from the blower typically ranges between 5 and 15 inches w.c. As the LFG is pushed from the blower toward the flare system, it is often routed through a metering device so flow rate can be measured and recorded.

Key process parameters are also measured in the blower facility through the use of pressure gages. The typical type and location of these gages include:

- Inlet temperature
- Inlet vacuum
- Inlet separator differential pressure
- Ambient temperature
- Blower suction pressure
- Blower discharge pressure
- Blower discharge temperature

7.d Operations and Maintenance

The typical blower is a single-stage or multi-stage centrifugal gas compressor that is belt-driven or directly-driven by an electric motor. Proper operations and maintenance of a blower facility requires the following types of activities, on an as needed basis (i.e., daily to monthly, depending upon the facility design, system components, etc.):

- Checking the pressures and temperatures associated with blower suction and discharge to make sure there is adequate flare fuel pressure
- Checking for out of the ordinary blower vibration or temperature (weekly)
- Periodically draining condensate from the blower housing
- Running standby blowers (weekly)
- Checking drive belt wear and tension (monthly)
- Observing the levels of lubricants
- Greasing appropriate equipment parts (electric drive motor)

- Looking at the position and condition of valves (check valve, block valve)
- Determining the quality and temperature of LFG gas
- Monitoring instrument air operation
- Figuring out the status of condensate, LPG, propane, lube oil tank levels
- Monitoring overall system operations.

If maintenance is required, it is important to note all activities in a log book and on recorder strip charts, and take all appropriate corrective action as soon as possible.

7.e Health and Safety

When working in the vicinity of the blower facility, the appropriate health and safety precautions associated with electrical equipment, noise, heat, etc., should be taken.

Loose items, such as identification badges hanging around the neck, should never be worn around belt-driven or rotating equipment. When performing any type of troubleshooting or testing, personnel should not wear rings, watches, id bracelets, or any other accessory that could be caught in the equipment.