

and small particle size that has an increased surface area. In 1999, the County completed a waste composition study to provide more detailed information about recent waste placement in the area of the proposed test. Additional information is in a March 1995 County waste sort report.

The County used soil as a daily cover at the site until March 1993. Since then, the County has primarily used removable and reusable tarpaulins (tarps) throughout Cell 8 as the cover (approximately 97 percent of the time, depending on weather conditions). Previous use of tarps (rather than soil cover, for example) presents good conditions for a bioreactor study, as there is less potential for the creation of barriers (e.g., compacted soil cover) to limit vertical penetration of liquid into the waste mass. Subcell 8.4 currently has an interim soil cover and an approximately 12 inch thick layer of shredded wood mulch generated from tree and yard waste.

## 2. Liquid Injection

To improve the evaluation of different infiltration systems, the proposed test area will include two vertical injection wells and two horizontal injection trenches. The two trenches are proposed to be constructed parallel to the nearest side slope and excavated so that they slope back toward the middle of the Cell 8.4 (southeast) at a 1 percent grade in order to minimize excavation depths, promote gravity drainage, and eliminate possible (landfill) side-slope seepage. The horizontal trenches would consist of 6-inch diameter perforated or slotted pipe centered in a 2 x 1.5-foot trench, backfilled with high permeability stone or gravel. Proprietary leachate pipe products that are relatively new to the waste industry may also be considered.

Plans for the two vertical wells consist of slotted or perforated 6-inch diameter pipe centered in a 3-foot diameter borehole and backfilled with high permeability stone. The well depths would be selected to penetrate between one-third and one-half the overall waste depth.

Design spacing for the wells and trenches minimizes overlapping areas of influence and will reduce uncertainties that may be introduced by overlapping influences. The injection devices are designed to maximize the amount of liquid that can be injected; however, actual injection rates will be varied in response to information learned from the degree of infiltration and resulting settlement. Design details of the proposed vertical wells and horizontal trenches are shown in Attachment V of the FPA and were submitted by the

County to MDE and EPA in an April 17, 2001 letter with enclosed drawings.

## 3. Settlement Plates

Prior to system startup, the County will install monuments (settlement plates) to monitor settlement caused by the degradation of the waste. These settlement plates will be strategically located around wells and trenches to measure surface movements during the study. The top elevation of each plate will be surveyed prior to liquid injection. The County plans to monitor these settlement plates at least monthly, but will do so more frequently if information suggests that settlement is occurring at a rapid rate. At least one plate will be located in a control area that is adjacent to the test area and outside the zone of influence for the liquid injection system. This control area will measure normal settlement rates as a comparison. Additionally, a stable elevation benchmark will be established to ensure that all readings are based on the same baseline elevation. Annual aerial topographic surveys will also be performed to aid in the evaluation of settlement and the effectiveness of the leachate recirculation.

## 4. Landfill Gas

The design capacity of the entire Landfill exceeds the New Source Performance Standard (NSPS) thresholds, and thus the Landfill must comply with 40 CFR part 60, subpart WWW. Cell 8 currently operates under an Alternate Operating Scenario (AOS) approved by the State of Maryland under its NSPS Program, and the County has included the AOS in its application for a Part 70 Permit (also known as a Title V permit) under the Clean Air Act (CAA). The Title V Permit for the Landfill was signed on August 29, 2001. The AOS provides that at Cell 8 LFG is collected via existing leachate collection system components, rather than from separate LFG extraction wells and/or trenches. The AOS also postpones the requirement for quarterly measurement of surface methane emissions under 40 CFR part 60, subpart WWW. The AOS applies to Cell 8 only. Each of the other Cells is part of an active LFG collection system comprising separate extraction wells and/or trenches, and are monitored quarterly for LFG.

Recognizing that the addition of liquids enhances the generation of LFG, the County has agreed to take all necessary steps to control and monitor LFG in the area of the bioreactor experiment. To accomplish these steps, and as further detailed below, the

County has: (1) Requested an amendment to its AOS under which it will be required to conduct quarterly surface methane emissions monitoring, beginning with a baseline measurement taken prior to the first introduction of liquids, and (2) in accord with the requested amendment, as the project progresses, evaluate the need to install supplemental LFG control devices, in the area of the bioreactor project in accordance with the NSPS for municipal landfills, 40 CFR part 60, subpart WWW. A copy of the County's proposed requested amendment was included in the FPA as Attachment IV. The County will undertake supplemental LFG response measures in accord with 40 CFR part 60, subpart WWW if methane surface emissions exceed 500 ppm or if significant odors from the test area are observed. The potential for surface emissions is likely to be greatest in the immediate area of liquids injection.

In addition, the County believes that there would be a reduced potential for LFG emissions at the landfill side slope because the slope is covered with an intermediate cap that consists of a vegetative layer over a two foot soil layer that has a permeability ranging from  $10^{-4}$  to  $10^{-5}$  centimeters per second. The existing LFG collection system for Cell 8 is designed to apply a continuous vacuum to the leachate collection pipe network under the waste in order to induce a pressure gradient to draw the LFG toward the collection network. Collected LFG is piped to an enclosed flare for destruction. If necessary, supplemental LFG collection and control may be implemented in the test area, based on results of quarterly methane surface emissions monitoring and observations of odors.

*A. LFG Monitoring.* Monitoring, record keeping and reporting requirements for LFG agreed to in the FPA signed by the County, EPA and MDE are contained in the Title V permit for the Landfill issued on August 29, 2001 pursuant to the CAA, 42 U.S.C. 7401 *et seq.* The Title V permit specifies that the LFG monitoring and reporting in the test area will be done according to the requirements of 40 CFR part 60, subpart WWW. The County will perform quarterly monitoring for surface emissions over the entire plateau area that includes the test area of Subcell 8.4. The plateau area measures approximately 180 feet by 300 feet and the test area is essentially centered on the plateau. Based on the results of the quarterly monitoring for surface emissions supplemental LFG monitoring and control may be required by the County's Title V permit,