

whether these alternative approaches provide benefits at the specific facility affected, and determine whether these projects should be considered for wider application. Such pilot projects allow EPA to proceed more quickly than would be possible when undertaking changes on a nationwide basis. EPA may modify rules, on a site- or State-specific basis, that represent one of several possible policy approaches within a more general statutory directive, so long as the alternative being used is permissible under the statute.

On September 18, 2000, EPA published a notice in the **Federal Register** requesting comments on the draft Final Project Agreement (FPA) for the Anne Arundel County Millersville Landfill XL project (65 FR 56308). The FPA was signed by EPA on December 7, 2000. A copy of the FPA is available in the docket and on the world wide web at <http://www.epa.gov/projectxl/>. The FPA is a non-binding written agreement between the project sponsor and regulatory agencies which describes the project in detail, discusses criteria to be met, identifies performance goals and indicators, and outlines how the agreement will be managed.

#### *B. What Are Bioreactor Landfills?*

A bioreactor landfill is generally defined as a landfill operated to transform and stabilize the readily and moderately decomposable organic constituents of the waste stream by purposeful control to enhance microbiological processes. Bioreactor landfills generally employ the addition of liquids such as leachate. A byproduct of the waste decomposition process is landfill gas, which includes methane, carbon dioxide, hazardous air pollutants and volatile organic compounds (VOCs). Landfill gases are produced sooner and faster in a bioreactor than in a conventional landfill. Therefore, bioreactors typically incorporate landfill gas collection systems to collect and control landfill gas upon start up of the liquid addition process.

On April 6, 2000, EPA published a document in the **Federal Register** requesting information on bioreactor landfills, because the Agency is considering whether and to what extent the Criteria for Municipal Solid Waste Landfills (MSWLFs), 40 CFR part 258, should be revised to allow for leachate recirculation over alternative liners in MSWLFs (65 FR 18015). EPA is seeking information about liquid additions and leachate recirculation in MSWLFs to the extent currently allowed, *i.e.*, in MSWLFs designed and constructed with

a composite liner as specified in 40 CFR 258.40(a)(2).

Proponents of bioreactor technology believe that operating MSWLFs as bioreactors provides a number of environmental benefits, including an increased rate of waste decomposition, which in turn would extend the operating life of the landfill and lessen the need for additional landfill space or other disposal options. Bioreactors are also believed to decrease, or at times eliminate, the quantity of leachate requiring treatment and offsite disposal. Several studies have shown that leachate quality improves over time when leachate is recirculated on a regular basis. Based on these reasons, bioreactors are expected to decrease potential environmental risks and costs associated with leachate management, treatment and offsite disposal. Additionally, use of bioreactor techniques are believed to shorten the length of time the liner will be exposed to leachate and lower the long term potential for leachate migration into the subsurface environment. Bioreactors may reduce post-closure care costs and risks, due to the accelerated, controlled settlement of the solid waste during landfill operation.

Several additional related XL pilot projects involving operation of landfills with alternative liners as bioreactors are being implemented throughout the country. These additional bioreactor projects will enable EPA to evaluate benefits of different alternative liners and leachate recirculation systems under various climatic and operating conditions. As expressed in the above referenced April 2000 **Federal Register** document, EPA is interested in assessing the performance of landfills operated as bioreactors with alternative liners, and these XL projects are expected to produce valuable data.

The Anne Arundel County Millersville Landfill XL Project and the other related XL projects will provide additional information on the performance of MSWLFs when liquids are added to the landfill. The Agency is also interested in assessing how different types of alternative liners perform when liquids are added to the landfill, including maintaining a hydraulic head at acceptable levels. Additional information on bioreactor landfills is available at EPA's Web site at <http://www.epa.gov/epaoswer/non-hw/muncpl/landfill/bioreactors.htm>.

## **IV. The Anne Arundel County Millersville Landfill and Resource Recovery Facility**

### *A. Overview*

The Landfill is located approximately 15 miles south of Baltimore on 565 acres in Severn, Maryland. The Landfill, which began operations in 1975, is owned and operated by the County and is the only active MSWLF in the County. Since 1975, Cells 1 through 7 at the Landfill were opened, filled and closed. Cells 1 through 7 were constructed before the current solid waste disposal laws and regulations and were not lined. With the exception of Cell 1 West and Cell 3, all of these Cells are now capped. In 1995 and 1997 respectively, Cell 3 and Cell 1 West were "mined" by the County, *i.e.*, all the waste and underlying soil was excavated and either recycled, disposed of or used as cover in Cell 8. The footprint where Cell 1 West was located was graded and seeded and the footprint where Cell 3 was located is now a storm water infiltration basin.

Active landfilling is occurring in portions of Cell 8 at the Landfill. Cell 8 is approximately 1200 feet by 2400 feet in size and is divided into 8 subcells. Subcells 8.1 through 8.6 have been constructed with a geomembrane double-liner system, with primary leachate collection and leak detection (secondary collection) layers. Subcells 8.7 and 8.8 have not been constructed. Subcell 8.4, where the proposed bioreactor test area is located, has not received any waste in approximately two years. Subcell 8.6, where the proposed control area is located, is currently receiving waste.

In 2000 the Landfill accepted approximately 390 tons per day (tpd) of municipal solid waste (MSW), of which 1/3 (approximately 130 tpd) was recovered for reuse and recycling and the remaining amount (approximately 260 tpd) was landfilled. The Landfill serves on average 660 customers (residents and businesses combined) per day, 7 days per week. There are approximately 5,800 residents within a 1-mile radius of the Landfill; approximately 2,750 residents within a 0.5-mile radius; and approximately 900 residents within a 0.25-mile radius.

The Landfill presently generates approximately 8,000 gallons of leachate per day. Leachate is collected and pumped to a 305,000 gallon influent tank. The leachate then flows to a pretreatment plant at the Landfill where it is treated in controlled batches. From there it is discharged into a 305,000 gallon effluent tank and ultimately discharged to the sanitary sewer and