

into a publicly operated wastewater treatment works.

The leachate collection system in Subcell 8.4 of the Landfill consists of a two foot thick sand layer, a geonet that covers the entire bottom of the Subcell and a system of perforated high density polyethylene (HDPE) pipes placed in gravel blankets that overlay the geonet. Leachate is conveyed by the geonet and/or pipes to a sump, from which leachate is pumped and conveyed to an on-site leachate pretreatment facility. The leachate collection system in Subcell 8.4 is designed specifically to keep a very shallow depth of liquid on the top liner, and in any event less than the maximum 30 cm allowed under 40 CFR 258.40(a)(2) at all locations within the Subcell. In the sump areas, the liner system is enhanced by the addition of layers of geosynthetic clay liner (GCL) below both top and bottom geomembranes. The GCLs have saturated hydraulic conductivities of less than 1×10^{-9} cm/s. The GCLs together with the other liner components result in a double synthetic liner system beneath the sump. To monitor the integrity of the top liner, the quantity of leachate removed from the subcell sumps above the bottom liner (detection zone) is monitored on a continual basis. (The accumulation of some liquid due to condensation is expected and is considered a normal condition.) The number calculated and established as a "not to exceed guideline" is 100 gallons per acre of subcell floor per day. Daily monitoring of the liquid above the bottom liner will continue throughout the life of Subcell 8.4. To protect the drainage and liner system, the initial eight-foot lift of waste in Subcell 8.4 consisted of soft trash. Soft trash is solid waste that is collected from residential curbside trash pickups. No curbside waste may exceed four feet in length. Curbside household waste in general is softer than waste streams from commercial facilities or sources from homeowners self-hauling materials from their home or yard. This initial eight-foot lift of waste was compacted to six feet in thickness.

Forty-three groundwater and 29 Landfill Gas (LFG) monitoring wells are installed at the Landfill. The groundwater monitoring wells are installed within each water-bearing zone in the subsurface beneath the Landfill. The groundwater wells are sampled semi-annually, and the LFG monitoring wells are monitored quarterly. The County submits ground water sampling data to the Maryland Department of the Environment (MDE) for their review. Starting in 1995, the County has replaced a total of 14 private

home wells to address the detection of landfill leachate contaminants in the upper aquifer or water bearing zone. The County replaced these wells with deeper double cased wells into a deeper aquifer when they had confirmed the detection of landfill contaminants in two consecutive sampling rounds. The County also samples 8 other private home wells in the area twice a year to check for possible contamination. The groundwater contamination is believed to have originated from the older unlined cells at the Landfill that are now either capped or have been mined by the County. The County has proposed to MDE that monitoring well TW-20, that is directly down gradient from Cell 8, be designated as the groundwater point of compliance well for the XL Project. Landfill leachate contaminants have not been detected in TW-20 (acetone, which is a common laboratory reagent, and carbon disulfide have been detected three times and one time respectively but neither has been detected since April of 1999).

This XL project is part of Anne Arundel County's larger efforts to further improve the management of its solid waste. In 1995, the County adopted a comprehensive Solid Waste Management Strategy (Strategy), the main objective of which is to extend the life of the Landfill. The Strategy comprises an integrated system involving waste reduction, recycling, reuse and innovative technologies that provides for a multi-faceted approach for meeting the County's future solid waste management needs. Thus far, this Strategy has reduced the waste entering the Landfill from 800 tons/day in 1994 to 260 tons/day in 2000. The County has an approximately 30% recycling rate. The County operates three "convenience centers", including one at the Landfill, where residents can bring in and drop off, at no cost, a wide variety of materials for recycling including: Oil, anti-freeze, lead-acid batteries, appliances, metal, wood, cardboard, paper, plastic and yard waste. The County manages a total of approximately 320,600 tons of waste per year. Approximately 75% of this total is either exported for disposal outside the County or recycled. The remaining 25% is disposed of at the Landfill. When the Landfill opened in 1975 it had a projected life of 25 years, or until the year 2000. As a result of the County's Solid Waste Management Strategy, the Landfill is now projected to be able to accept waste until 2063.

B. Description of the XL Project

The County's bioreactor pilot project will involve injecting a controlled

amount of liquids through injection devices into a 160 foot by 200 foot (approximately 3/4 of an acre) test area located within the southwestern portion of Subcell 8.4. The XL project will last for up to a seven-year period (depending on effectiveness), and will involve the monitoring of settlement, production of LFG and improvement of leachate quality. The objectives of the project are as follows: To design and construct a bioreactor test area in Subcell 8.4 of the Landfill; perform liquid injection in a controlled manner using different injection methods; monitor surface settlement, injection rates and related parameters over a period of time; evaluate results and ultimately identify the method that will most effectively increase the Landfill's waste capacity; and evaluate cost effectiveness of bioreactor techniques as a method of capacity creation.

The following discussion provides information on the proposed pilot design. The drawings of the test area location, proposed system layout, and details of the supplemental LFG collection system (if required) were provided in the FPA Attachments IV, V, and VIII.

1. Proposed Test Area

The proposed test area measures 160 feet by 200 feet and is located within the southwestern portion of Subcell 8.4. The test area is centered in a trapezoidal shaped plateau that gradually slopes to the northwest at an approximately 2 percent slope. Subcell 8.4 is bounded on three sides by other existing subcells. The fourth side is adjacent to the side slope of the cell. The distance from the test area to the side slope varies from approximately 50 to 100 feet. The side slopes in Cell 8 are constructed at a 3:1 slope. The test area is adjacent to an existing haul road which makes it accessible to tank trucks for easier liquid injection. The waste volume in this area is approximately 95,500 cubic yards (waste depth from surface to liner is approximately 80 to 85 feet).

Subcell 8.4 began accepting MSW in October 1992. Subcell 8.4 has accepted only small quantities of curbside MSW since 1997; it last accepted primarily construction debris about two years ago. Thus, the lowermost portion of the waste in Subcell 8.4 contains typical MSW, while the uppermost portion contains waste that is proportionately higher in construction debris and lower in decomposable organic materials. Several lifts of typical MSW in the lowermost portion of the Subcell 8.4 were involved in a County "mauler" project. The mauler was used to grind the waste into a relatively homogeneous