

Buncombe County, North Carolina			
Preliminary Design Report for Project XL Bioreactor			
Proposed Modifications to the USEPA Project XL Final Project Agreement			
Item	Final Project Agreement Criteria	Proposed Modification	Reason for the Modification
1	In Table 1 on page 12 of the FPA it is stated that chipped tires will be used in the gas collection system.	Crushed stone will be used in place of chipped tires.	Chipped tires are sensitive to overburden pressures due to the compressibility of the material which can cause significant decrease in the permeability of the material. The compressibility also results in less structural support of the plastic pipe which reduces the factor of safety against pipe failure.
2	Table 2 of the FPA states that leachate quality will be tested monthly during the first six months of bioreactor operation of a cell, quarterly during the second six months of operation, and semi-annually thereafter.	Monthly sampling and testing until such time the leachate quality stabilizes. Once the bioreactor process for a given cell is firmly established in the methane producing stage and the leachate quality is not changing significantly then the sampling frequency can be reduced to annually.	Dr. Reinhart and Dr. Barlaz recommend that the frequency remain at monthly for an extended period of time in order to more closely monitor changes in the bioreactor process.
3	Table 2 of the FPA states that leachate will be tested for: pH, Conductivity, Dissolved Oxygen, Dissolved Solids, Biochemical Oxygen Demand, Chemical Oxygen Demand, Organic Carbon, Ammonia Nitrogen, Total Nitrogen, Total Phosphorus, Common Ions, Heavy Metals, Organic Priority Pollutants	Leachate will be tested for: pH, Biological Oxygen Demand, Chemical Oxygen Demand, and Ammonia.	Dr. Reinhart and Dr. Barlaz recommend that the number of leachate parameters listed in Table 2 of the FPA be pared down to eliminate unnecessary parameters. The four parameters listed are sufficient to assess the decomposition process. The parameters listed in Table 2 of the FPA are tested on a semi-annual basis as required by NCDENR.
4	Table 2 of the FPA states that gas will be tested weekly for CH ₄ , CO ₂ , O ₂ , and N ₂ ; semi-annually for NMOCs, N ₂ O, and surface emissions; and monthly for gas temperatures.	Gas will be tested monthly for CH ₄ , CO ₂ , O ₂ , N ₂ , Pressure, and Temperature; quarterly for surface emissions; NMOCs will be tested at startup if the LFG is not treated. N ₂ O will not be tested.	Testing parameters and frequencies were modified to comply with NSPS requirements as listed in the adjoining column. More frequent testing for gas composition was not perceived to improve the monitoring process.
5	Table 2 does not include monitoring for leak detection.	Leak detection sumps for each cell will be inspected monthly.	Leak detection is a critical monitoring parameter for determining the performance of the alternative liner system.
6	On page 17 of the FPA it is stated that at least several feet of waste will be present over the HIT when injecting liquid	A minimum of 30 feet of waste will be placed over the HIT prior to starting the injection process.	The waste overburden will prevent the buildup of pore pressure in the waste and leachate seeps.
7	Table 2 of the FPA states a monitoring frequency of annually for moisture content and does not list temperature.	Moisture content and temperature will be recorded on a monthly basis.	Moisture and temperature data are critical for assessing the performance of the bioreactor. The frequency was increased to provide ample information for operating the system.