91st Avenue 3-Phase Anaerobic Digestion Process Improvements

Carollo performed the biosolids study in February 2001. Carollo analyzed six advanced digestion alternatives and evaluated them with respect to capacity optimization, performance, operational impacts and facility impacts. Two-phase and three-phase digestion ranked highest for the criteria evaluated and was selected over temperature phased digestion, staged thermophilic and improved digester mixing. The team then performed further evaluations to determine the detailed impact of retrofit of the plant to two-phase meso-meso (Class B process) and two-phase meso-thermo with an optional third phase. The two-phase meso-thermo process with an optional third phase was analyzed to determine what additional costs would be incurred to acquire the additional benefit of producing Class A biosolids. Two-phase meso-thermo can be operated in continuous mode or batch mode to meet Class A quality requirements. The detailed impact analyses determined the modifications and costs required to retrofit the digesters, sludge piping, sludge transfer pumping, digester heating, gas conveyance, gas treatment, dewatering and odor control facilities. In addition, the impact of return streams was evaluated.

The results of the detailed impact analyses indicated that the next digester expansion can be delayed for operation in two-phase meso-meso or two-phase meso-thermo with an optional third phase. Minor sludge piping modifications, a transfer pump, increased capacity for twelve of the sixteen digester heat exchangers, and the addition of a sidestream centrate treatment process will be required. Conversion to either meso-meso or meso-thermo was economically feasible, on a capital cost basis, when compared to the cost of adding two new conventional digesters.

Carollo completed the detailed design in February 2003 for the digester modifications for two-phase meso-thermo digestion with an optional third phase. This project can either produce a high quality Class B biosolids, or an exceptional quality Class A, depending on operator preference.