

ARLINGTON COUNTY WATER POLLUTION CONTROL PLANT – MASTER PLAN 2001 UPDATE

Technical Memorandum XIII

Solids - Aerobic Digestion

April 29, 2002

1 INTRODUCTION

Aerobic digestion is evaluated for liquid processing Option 2 (see Tech Memo IV) which includes demolition of the primary setting tanks and construction of activated sludge facilities on the north side of Glebe Road. Aerobic digestion is proposed to stabilize all of the solids, all of which are produced in waste activated sludge facilities. The use of aerobic digestion versus anaerobic digestion reduces the potential for odors and the quantities for dewatering.

2 THICKENING

WAS would be thickened by dissolved air flotation to achieve 4.0 percent thickened solids concentration. The two circular gravity thickeners would be converted to DAFTs. Costs for this option are provided in Tech Memo X on solids thickening.

3 AEROBIC DIGESTION

This option assumes that conventional aerobic (Class B) digestion is developed as follows:

- Provide 35 days of detention time at a maximum month with one tank out of service.
- Construct four new aerobic digesters each providing 3.0 million gallons of capacity.
- Each new digester would be 122 foot diameter and 33.5 sidewater depth. These sizes are required due to limited space on-site.

At 35 days SRT and at the sludge temperature at the Arlington County Plant, aerobic digestion can meet requirements for Class B biosolids. At least 40 percent volatile solids reduction is planned to meet the vector attraction reduction requirements. The evaluation of liquid processing Option 2 with Aerobic Digestion is based on four new aerobic digesters providing 12.0 million gallons total capacity.

4 FACILITIES AND CAPITAL COSTS

Proposed facilities and construction/capital cost estimates are summarized as follows:

Alternative 3 – Aerobic Digestion	Cost
Demolition of “P” tanks, “S” tanks, and related facilities	\$3,300,000
Four new 3.0 MG disasters with fine bubble diffusers	\$11,000,000
Blowers for aerobic digesters	\$1,500,000
Odor scrubbing (20,000 scfm @ \$50/scfm)	\$1,000,000
Subtotal	\$16, 800,000
Yard piping, electrical, site work, instrumentation @ 15%	\$2,500,000
Subtotal	\$19,300,000
Plus 35% construction contingencies	\$6,800,000
Construction cost estimate	\$26,100,000
Plus 35% engineer/administrative/management	\$9,100,000
Capital cost – Alt. 3	\$35,200,000

5 OPERATION AND MAINTENCE COSTS – DIGESTION

Annual O&M costs for aerobic digestion are presented here:

Cost Element	Annual O & M Cost
Labor	\$90,000
Power	\$460,000
Chemicals ^a	\$30,000
Maintenance and cleaning	\$110,000
Total	\$690,000/year

^a Odor control chemicals, primarily

6 DEWATERING PERFORMANCE AND COSTS

Dewatering on the existing Andritz centrifuges is anticipated to be as follows:

Flow rate (ave. annual)	=	205,000 gal/day
Expected Feed Solids	=	2.8% TS
Cake solids content	=	22% solids
Polymer use	=	25 lbs per ton dry solids
Solids capture	=	95%
Centrifuge operations	=	1 machine, 24 hr/day, 5-6 days/wk 2 nd machine (as necessary)

Dewatering O& M costs at 40 mgd ADWF are expected to be as follows:

Cost Element	Annual O&M Cost
Labor	\$360,000
Power	\$110,000
Polymer	\$280,000
Maintenance	\$150,000
Total	\$900,000/year

Total quantity of digested, dewatered solids is about 24 dry tons/day, or 109 wet tons/day on average annual basis.