SOLVING FOAMING PROBLEMS AT NASHVILLE CENTRAL WWTP

Vaughan's new Foambuster nozzle solves foaming control problems without the need for expensive defoamant chemicals.

By Glenn R. Dorsch, P.E, VP/Chief Engineer, Vaughan Co. Inc.

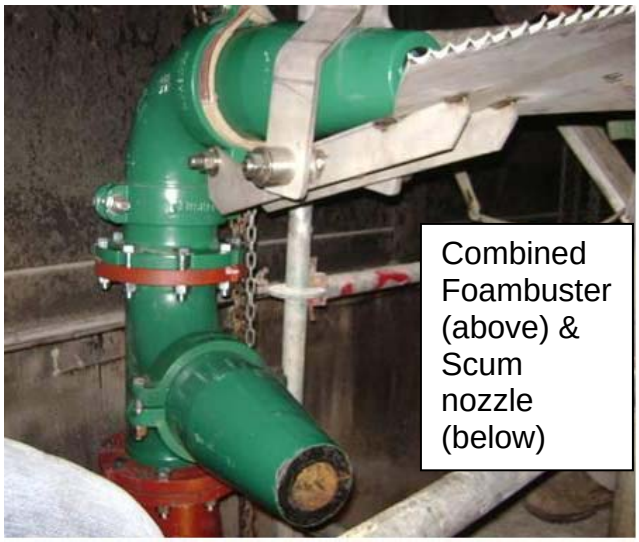
This project provides an unusual "before-and-after comparison" of how a high-solids loaded digester system with a Rotamix mixing system performed before and after the Foambuster was installed. Vaughan Co. provided Rotamix nozzle mixing systems to mix digesters 1 through 4 at the Nashville Central WWTP in August, 2006. Each system consisted of 2 parallel-operated 75 HP, 8" discharge chopper pumps and a combination of 4 dual and 4 single floor-mounted nozzles to mix each 108-ft digester. Three of these digesters have fixed covers and a fourth has a membrane cover. As intended, the high-solids loaded digesters have been very successful at generating gas, but the accompanying foaming has caused some operational limitations. The causes of foaming are complex but generally are the result of unstable biological conditions. Surveys of activated sludge plants in the United States indicated that over half of them experienced foaming problems (Pitt and Jenkins, 1990).

Vaughan Co. was asked by the project consulting engineer for ideas on how to suppress foam. The option selected was the use of the Vaughan Foambuster combined with a scum nozzle immediately below the surface. The Foambuster is mounted about a foot above the upper sludge surface and requires about 4 ft. of headroom above the

Nashville Central WWTP

Foambuster nozzle to accommodate the arc of the spray pattern. The patent pending Foambuster uses the same glass-lined ductile iron nozzle as the Rotamix nozzles but also uses a stainless steel splashplate to deflect the nozzle discharge and create a broad spray of sludge droplets designed to wet and break up foam forming on the surface of the digester sludge. The Foambuster spray is designed to cover the 54-ft tank radius with a wide spray pattern width. The below-surface scum nozzle helps to maximize rotation of the upper surface below the Foambuster nozzle so that the spray pattern can suppress foam over the entire upper surface of the digester.

The combination Foambuster (above) and scum nozzle (below) are shown in the photo below where they are



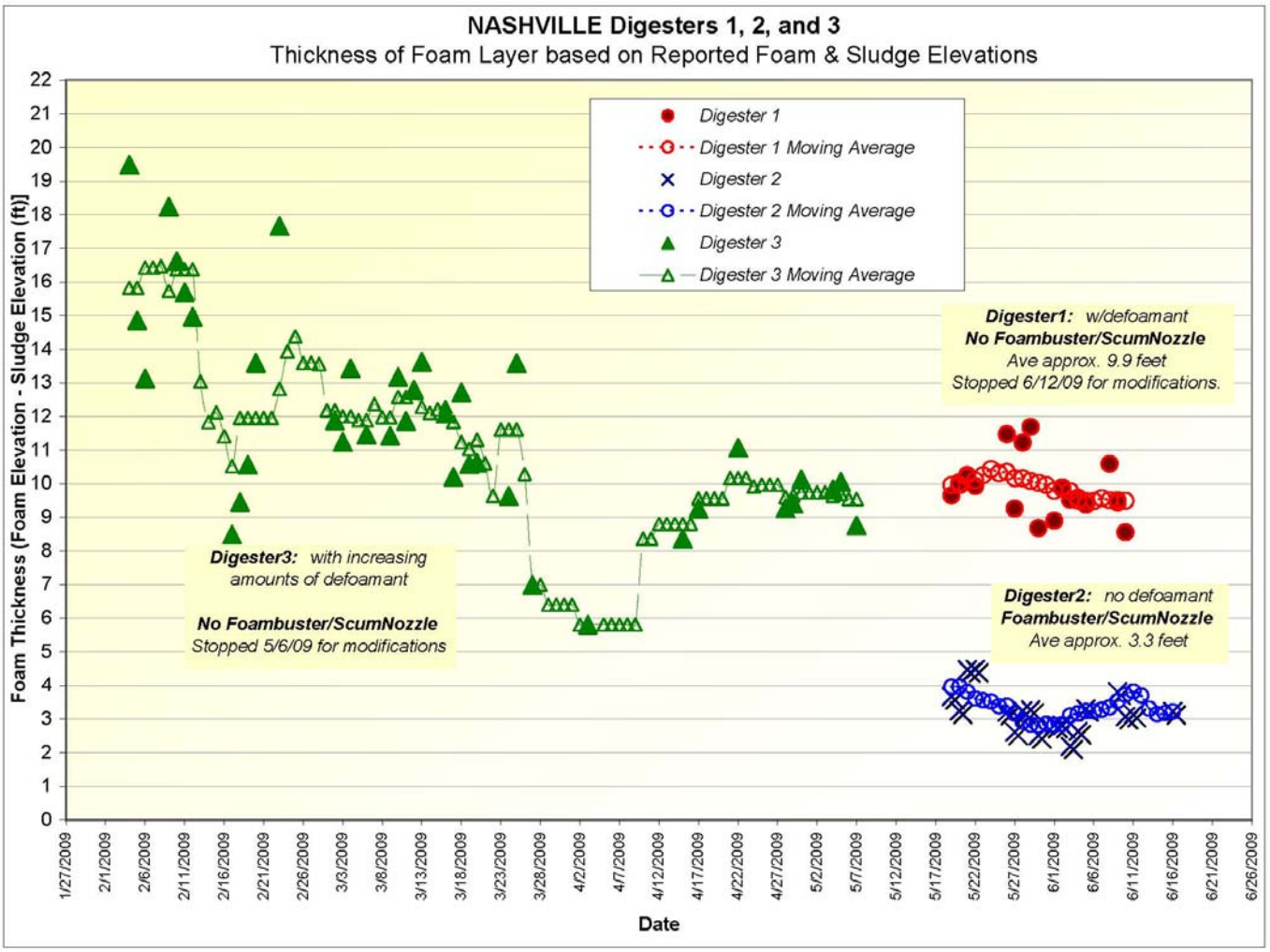
Combined Foambuster (above) & Scum nozzle (below)

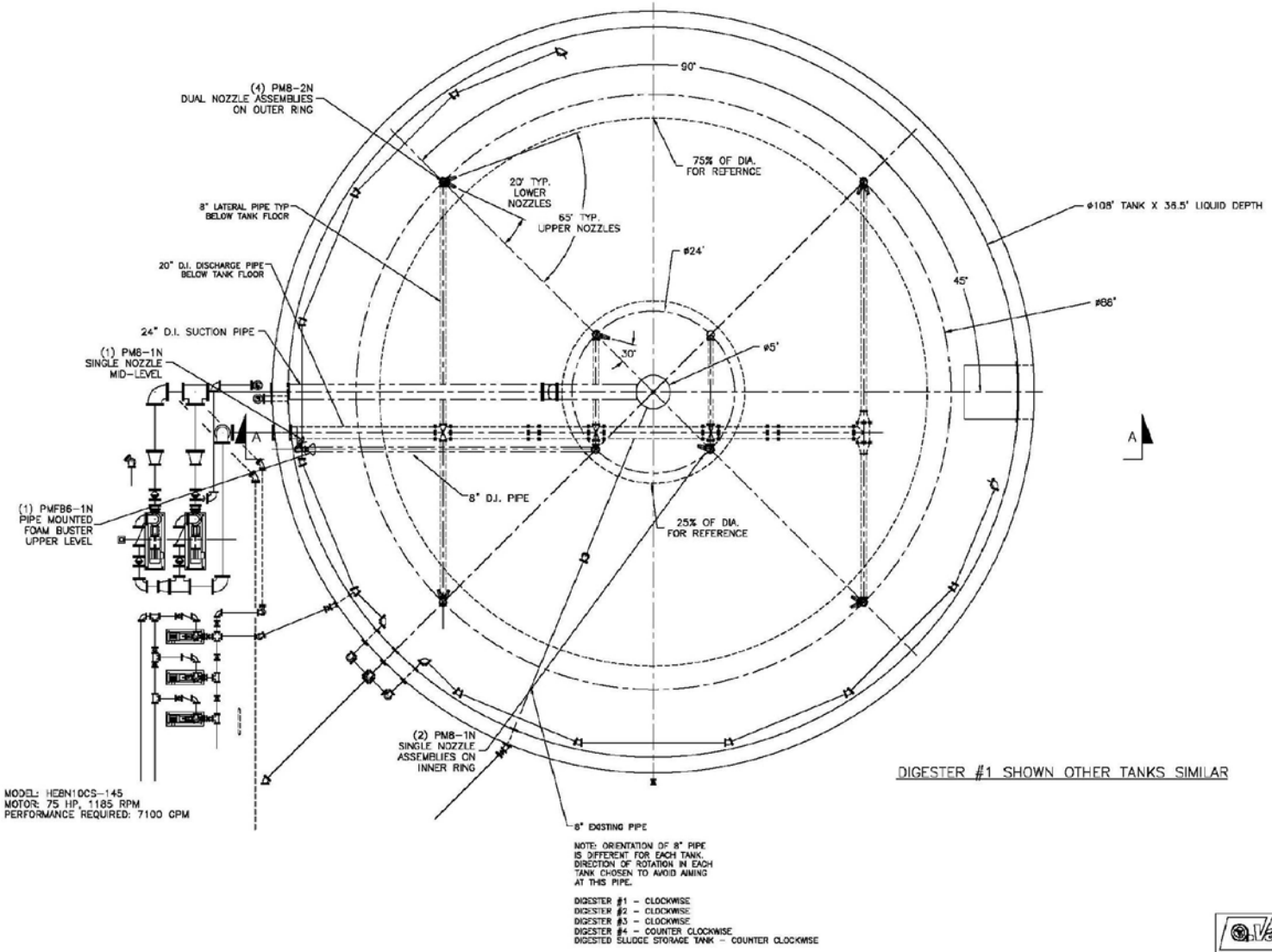
mounted on the Nashville Central WWTP digesters 1, 2 & 3 tank walls. This approach was used for the 3 fixed roof digesters. The Foambuster nozzle was aimed at the tank center while the scum nozzle was aimed at 45° off the tank center to help reinforce the counter-clockwise rotation of the digester sludge caused by the floor-mounted nozzles. To assure that the pumps could accommodate the added flow from these two added wall-mounted Foambuster and scum nozzles, two inner- ring, single floor-mounted nozzles were capped off and removed from service. This change kept the number of tank nozzles at 12, consistent with the original installation of only floor-mounted nozzles.

The graph below shows the results of installing the Vaughan Foambuster in Digester 2. On Digesters 1 and 3 where the Foambuster had not yet been installed, foam levels were as high as 19+ ft. above sludge levels and were typically at 10-12 ft above sludge levels with the use of significant quantities of defoamant. Data from Digester 2 with Foambuster installed shows that foam levels above sludge levels now range from 2 ft. near the Foambuster, 4 ft. on the other side of the tank, 3 ft. average. Defoamant is no longer needed.

In conclusion, on average the Foambuster is controlling foam levels to about 15-30% of previous levels with the added benefit that expensive defoamant is no longer required.

Vaughan Company Inc, Montesano, WA, 360-249-4042; www.chopperpumps.com.





PRELIMINARY (ALT. A)
NOT FOR CONSTRUCTION

REVISION LIST			
DATE:	REV#:	DESCRIPTION:	BY:
1/30/06	1	TANK DIA WAS 110' NOW 108'	KCW

DIGESTER #1 SHOWN OTHER TANKS SIMILAR

NOTE:

1. NOZZLE ANGLES TO BE POSITIONED IN FIELD BY VAUGHAN ENGINEER.
2. VAUGHAN CO. TO SUPPLY PUMP(S) AND NOZZLE ASSEMBLIES. ALL PIPING TO BE SUPPLIED & INSTALLED BY OTHERS. PIPING LAYOUT & FITTINGS FOR ILLUSTRATION PURPOSES ONLY.

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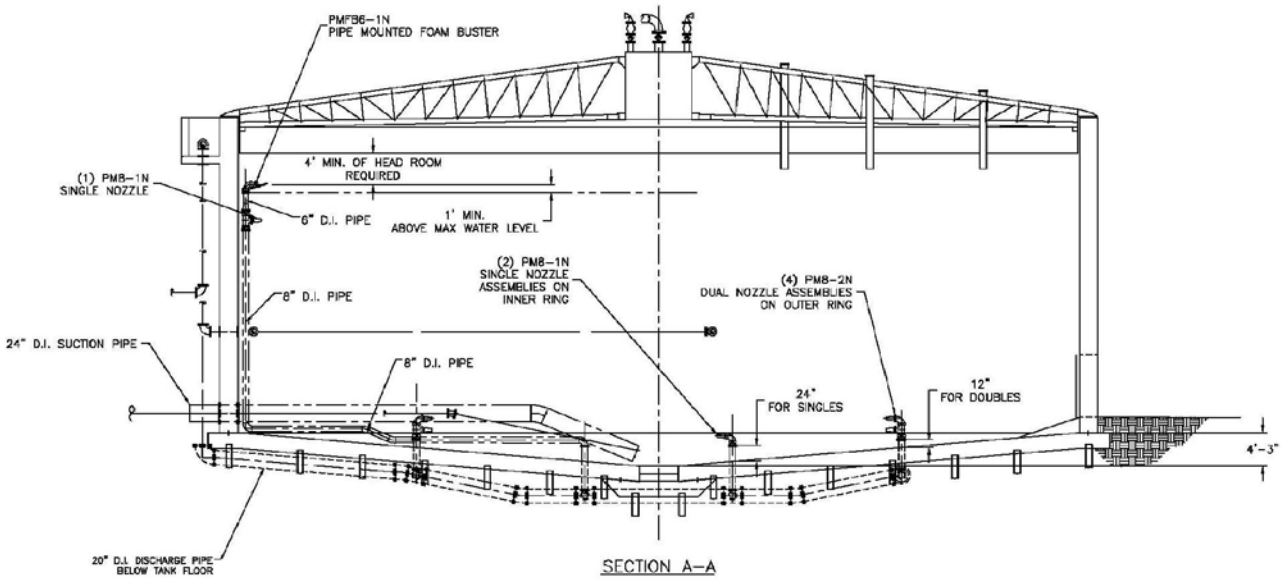
TITLE:
ROTAMIX SYSTEM
NOZZLE LOCATION PLAN
DIGESTER #1 SHOWN
NASHVILLE CENTRAL WWTP
SHEET 1 OF 2

CHECKED:	DESIGNED:	DRAWN BY:	SCALE:	PART NUMBER:
MCP	GRD	KCW	1/8"=1'	
JOB ORDER NUMBER:		DATE:	DRAWING NUMBER:	REVISION NUMBER:
		1/5/06	110999	1



SECTION A-A

DIGESTER NO.1

PRELIMINARY (ALT. A)
NOT FOR CONSTRUCTION

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TITLE:
ROTAMIX SYSTEM
NOZZLE LOCATION PLAN
DIGESTER #1 SHOWN
NASHVILLE CENTRAL WWTP
SHEET 2 OF 2

ENGINEER:	DRAWN:	DRAWN BY:	SCALE:	PART NUMBER:
MCP	GRD	KCW	1/8"=1'	
JOB ORDER NUMBER:		DATE:	DRAWING NUMBER:	REVISION NUMBER:
		1/5/06	110999	1