Aqua America, Inc.
762 W. Lancaster Avenue
Bryn Mawr, PA 19010

www.aquaamerica.com

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Professor Albert Robbat
Tufts University
Chemistry Department
62 Talbot Ave
Medford, MSA 02155

Denise K. Breiteneicher
Project Manager, Technical Services
Massachusetts Water Resources Authority
100 First Avenue Building 39
Boston, Massachusetts 02129

Dear Professor Robbat,

It is my understanding you would like me to provide MWRA with information regarding downstream impacts of the grease transforming product, Protein Matrix, and more particularly, impacts on downstream wastewater treatment facilities. I further understand that the City of Woburn desires to use Protein Matrix in their collection system to address grease formation; the City's wastewater flow ultimately goes to MWRA's system. I also understand that you would like to conduct a longitudinal study in which you continually feed (daily, weekly) small quantities of Protein Matrix to determine if it is possible and economical to keep grease traps in commercial restaurant environments free of fat and grease. Toward that end, you have asked us to provide this letter since Aqua Pennsylvania Wastewater, Inc., a division of Aqua America, Inc. has been using Protein Matrix for nearly 3 months to address similar issues at one of our wastewater facilities in northeast Pennsylvania.

We have been using Protein Matrix in a collection system which we own and which serves a resort community connected to our Woodloch Springs stream discharge Wastewater Treatment Plant for almost 3 months. The product is being introduced into a pump station wet well which had been a constant operation and maintenance problem due to the accumulation of oil and grease mats; we had to clean the station weekly with a pumper truck. Since we started feeding Protein Matrix into the station we have discontinued the weekly pump-outs and have not had to conduct any cleanouts since we started using the product. There has been no accumulation of oil and grease in the wet well. Our Northeast Wastewater Operations Superintendent is thrilled. Further, and to an additional point which I understand you have concern, we have not observed the accumulation of grease downstream of this particular pump station, which has a 3 mile long force main, and which subsequently discharges into a gravity

sewer which flows a considerable distance before combining with other flow and entering our wastewater treatment plant at Woodloch Springs. We have observed no impact, let alone an adverse impact, on our wastewater treatment facility including but not limited to changes in effluent quality, settling characteristics of the plant mixed-liquor nor any change in chemical demands of the process.

Additionally, we are about to begin testing the Protein Matrix product by adding it directly to the influent flow of our Bridlewood Farm Wastewater Treatment and Land Application Disposal Facility. This facility employees the sequencing batch reactor (SBR) treatment technology since the facility has a total nitrogen limit. As with many SBR systems configured for nitrogen removal, they are predisposed to develop filamentous organisms in the wintertime which negatively impact settling of the mixed liquor. The filaments capitalize on the grease particles on the surface of the treatment units – they are able to absorb and directly metabolize the grease unlike the other more desirable organisms in the treatment process in cold weather. In this way filamentous organisms become "selected" and their population increases exponentially. In the summer time the grease tends to be softer and, in combination with the good organism's exocellular enzymes, dissolves more in the warmer water in contrast to winter months. We are optimistic that the Protein Matrix will liquefy and transform the particulate grease making it more soluble and bioavailable to the desirable good organisms rather than the filaments. In this way we are hopeful that past issues with effluent water quality will be a problem of the past.

We hope that our comments have been helpful to you. Should you have questions or wish to contact me personally, I may be reached at 610-645-1092 or mjbubel@aquaamerica.com.

Sincerely,
Aqua Pennsylvania Wastewater, Inc.

Mark J. Bubel, P.E.
Senior Project Engineer

xc: G. Miller