

## **MEMORANDUM**

TO: Mark A. Masse, CPA | Senior Vice President of Operations, GCEDC

FROM: Nick Bayer, P.E. | Environmental Engineer, CPL

DATE: February 11, 2022

RE: STAMP Mercury Treatment

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Based on recent discussions with the New York State Department of Environmental Conservation (“NYSDEC”), CPL has analyzed the technical feasibility of treating wastewater to meet the mercury limit proposed for the STAMP wastewater treatment facility (WWTF) in the draft state pollutant discharge elimination system (SPDES) permit issued by NYSDEC. This memo discusses the results of CPL’s analysis.

The STAMP site will not have dentists or other customers that would discharge mercury into the sanitary sewer, so the only anticipated source of mercury in STAMP wastewater would be the mercury that may already be present in the municipal drinking water provided to the STAMP site. STAMP has the potential to receive drinking water from Monroe, Erie, and Niagara Counties. The proposed SPDES permit requires the mercury testing methodology to be EPA 1631E which tests to a minimum detect level of 0.5 ng/L with a proposed discharge limit of 0.7 ng/L. The EPA limit for drinking water in mercury is 0.002 mg/L which equals 2,000 ng/L. Thus, the discharge limit for mercury is a tiny fraction (0.7 ng/L) of the allowable limit for mercury in drinking water (2000 ng/L).

The testing methodology required by the EPA for drinking water is the Cold Vapor Technique or EPA 245.1, 245.2 which has a detection limit of 200 ng/L. The water quality reports for the three potential water sources for the STAMP site show that all source waters report non-detect for mercury. Assuming that the DEC were to require a treatment system that will ensure discharge down to the proposed permit limit of 0.7 ng/L for mercury, we will assume that the mercury concentration for sanitary wastewater entering the treatment system is at 200 ng/L, the non-detect level reported for the municipal drinking water sources. This is likely a very conservative assumption, as the background levels of mercury for Lake Erie and Lake Ontario, the water sources for the municipal drinking water, have been reported to be between 2 – 10 ng/L.

Several treatment technologies were investigated to reduce mercury in the effluent from 200 ng/L to 0.7 ng/L including granular activated carbon (GAC), ion exchange, and reverse osmosis (RO). In all cases, there would be a waste product that accumulates mercury and would need to be handled as a hazardous material and disposed of at a hazardous waste landfill. For ion exchange, it would be the sacrificial media and for the RO system it would be the reject water. This reject water would need to be treated further either by GAC or chemical coagulation and both would produce a hazardous material. Ultimately, GAC is recommended as the preferred treatment option because of the relative simplicity of the system and certain cost advantages over the other options.

A GAC filter system was sized for the average daily flow for the STAMP WWTF of 1 million gallons per day (MGD). The system would consist of two trains of a series of five pressure vessels. The two trains will ensure redundancy. The proposed system is based on a contact time of 5 minutes for guaranteed results and extended change out times, lowering the ongoing operating costs. This design is preliminary, and a site-specific pilot test will be required to refine the design and guarantee consistent treatment. This testing could result in a smaller or larger system.

Since the carbon will be absorbing toxic mercury compounds, back washing is not a possibility and thus we have incorporated two trains of filters (duty/standby) with 10- and 5-micron filters to help prevent blockages in the carbon media from solids. The initial pressurized vessel, filled with GAC, will remove 99% of the mercury from the wastewater and the system piping and valving will be set up to switch to the next pressure vessel in the series when the first vessel’s filter media is used up.



The GAC filter would be installed after the UV disinfection system for the WWTF because this is the cleanest water to filter. The water would need to be lifted to the filters and pressurized as the filters will create high head losses. A large wet well would be required to equalize the decanted discharge from the WWTF, and pumps would lift the water and pressurize it through the filters. This additional infrastructure would require added space to the WWTF footprint. The filtered water would then flow to the main pump station (MPS) to be discharged offsite.

The projected capital costs for this system are summarized below:

Item	Quantity	Cost (EA)	Total Cost
Filter Building	1	\$ 300,000.00	\$ 300,000.00
GAC Filter Equipment	1	\$ 3,500,000.00	\$ 3,500,000.00
Installed Cost (20% of Equipment Cost)	1	\$ 700,000.00	\$ 700,000.00
Wet Well	1	\$ 500,000.00	\$ 500,000.00
Sanitary Sewage Pumps w/ VFDs (Dry pit Submersible)	4	\$ 150,000.00	\$ 600,000.00
Electrical (15% of Equipment Cost)	1	\$ 615,000.00	\$ 615,000.00
<b>Subtotal =</b>			\$ 6,215,000.00
<b>Contingency &amp; ELA (40%) =</b>			\$ 2,486,000.00
<b>Total =</b>			<b>\$ 8,700,000.00</b>

The spent GAC filter media would need to be cleaned out and disposed of and replaced with new media. Because this is a hazardous material, the operators would need to be trained and would require special equipment. The media would need to be disposed of at a hazardous waste landfill, which would add to the operational expense. The estimated replacement and disposal costs for the operations are approximately **\$900,000** per year.

In summary, while technically feasible, it would be very expensive to install and operate a treatment system to impose a treatment system to ensure mercury treatment to the low permitted discharge levels.

If you have any questions or need additional information, please contact Nick Bayer by phone at (585) 324 – 0488 or nbayer@cplteam.com.

Very truly yours,

CPL

Nick Bayer, P.E.