Oregon
Tina Kotek, Governor

Department of Environmental Quality
Agency Headquarters
700 NE Multnomah Street, Suite 600
Portland, OR 97232
(503) 229-5696
FAX (503) 229-6124
TTY 711

March 24, 2025

Georgia-Pacific Toledo LLC
1400 SE Butler Bridge Road
Toledo, OR 97391
Sent via email only

Ann Vorderbrueggen,

DEQ received the submittal of the Cleaner Air Oregon (CAO) Emissions Inventory (Inventory) for Georgia-Pacific Toledo LLC (GP Toledo) in Toledo, OR on May 27, 2022. DEQ completed an initial review and provided comments regarding emissions estimates from the wastewater treatment plant (WWTP) in letters dated February 6, 2024, and April 24, 2024. GP Toledo provided responses to the information requests in submittals dated May 6, 2024, and August 22, 2024, and DEQ has completed an initial review. DEQ will provide responses to non-wastewater portions of the Inventory separately.

In accordance with Oregon Administrative Rule (OAR) 340-245-0030(2), DEQ has determined that the following additional information, corrections, and updates to the WWTP emissions are required in order to approve the Inventory:

General Comments

Hydrogen Sulfide Emission Estimates from WWTP

DEQ received National Council for Air and Stream Improvement's (NCASI) February 26, 2024, technical memorandum describing the approach used by GP Toledo to develop emission estimates for hydrogen sulfide from the WWTP. DEQ met with GP Toledo and NCASI on both February 29, 2024, and June 13, 2024, to discuss emissions from the WWTP; additionally, DEQ received additional supporting information from GP Toledo on May 6, 2024, and August 22, 2024. DEQ has reviewed the memorandum and supporting documentation and determined that the proposed method is insufficient to provide representative hydrogen sulfide emissions data and DEQ is unable to approve the estimation approach for the use in the CAO Inventory.

In the August 22, 2024, submittal, GP Toledo provided results of a H2SSIM model for the WWTP sulfide emissions – the H2SSIM model was developed specifically for the pulp and paper industry by the NCASI. Based on the information provided, DEQ was unable to confirm the inputs and results of this model and could therefore not confirm the results presented. To improve the representativeness of the H2SSIM models, DEQ will require that GP Toledo collect additional wastewater data to determine seasonal and process variations, modify the model to conform with NCASI's H2SSIM guidance document, and rerun the H2SSIM model for all distinct basins of the WWTP.

DEQ has reviewed NCASI's Technical Bulletin No. 1000 (TB 1000), which outlines the H2SSIM model, and has developed H2SSIM model configurations based on information provided by GP Toledo. Selection of model zones was informed by recommended procedures in Section 5.4.1 of TB 1000. As recommended in TB 1000, DEQ looked at the following factors (in order of priority) when defining model zones:

- Physical boundaries (such as weirs or in-basin curtains)
- Dissolved oxygen and pH gradients
- Mechanical aeration density
- Temperature gradients
- Hydraulic regime considerations

DEQ based zone determination primarily on physical boundaries and mechanical aeration density as this could be determined based on an aerial review of the system and information previously provided by GP Toledo. Figure 1, included as an attachment to this letter, shows DEQ's proposed zoning assignment for the WWTP. Redox and zone mixing conditions are based on information presented in Sections 4.1.5 and 5.4.4 of TB 1000, respectively. The Specific Comments section outlines the updates and additional data needs required for the updated H2SSIM models.

Water9 Model

DEQ received GP Toledo's Water9 modeling files and supporting information in submittals on May 6, 2024, and August 22, 2024. DEQ has reviewed the Water9 model and supporting documentation and determined that the current model is insufficient to provide representative emissions data for the WWTP. To improve the representativeness of the Water9 models, DEQ will require that GP Toledo collect additional wastewater data to determine seasonal and process variations, modify the model to include all WWTP components, and rerun the Water9 models. The Specific Comments section outlines the updates and additional data needs required for the updated Water9 models.

DEQ continues to remain available to discuss the development of the H2SSIM and Water9 models with GP Toledo.

Specific Comments

1. Submit to DEQ sampling plan(s) for the liquid sampling of the WWTP noted below and as detailed in Attachment B by May 26, 2025. The sampling plan(s) must be developed in accordance with current DEQ guidelines and address the following:
    a. To support the H2SSIM models, GP Toledo must conduct one year of monthly liquid sampling, as well as during unusual conditions or operational changes, at various locations throughout the WWTP for the below parameters in accordance with 40 CFR 136. Proposed sample collection locations are noted on Figure 1. See Attachment A for an outline of the sample parameters to be collected at each sample location.
        i. Flow rate (MGD, MLD, cfs, or cms)
        ii. Total sulfide (mg/L or ppb)
        iii. Sulfate (mg/L or ppb)
        iv. Dissolved oxygen (mg/L)
        v. Temperature
        vi. pH
    b. To support the Water9 models, GP Toledo must conduct one year of quarterly liquid sampling, as well as during unusual conditions or operational changes, at various locations throughout the WWTP for the below parameters. Proposed sample collection locations are noted on Figure 1. See Attachment A for an outline of the sample parameters to be collected at each sample location.
        i. Ammonia (Method 350.1)
        ii. Purgeables by GC/MS (Method 624.1)
        iii. Base/Neutrals and Acids by GC/MS (Method 625.1)

iv. Carbonyl Compounds by HPLC (Method 8315A)

c. GP Toledo must conduct one year of quarterly liquid sampling of mill effluents for per- and polyfluoroalkyl substances (PFAS) by LC-MS/MS (Method 1633A). Proposed sample collection locations are noted on Figure 1. See Attachment A for an outline of the sample parameters to be collected at each sample location.

d. Monthly and quarterly sampling must be conducted during a period of typical production activities. An abnormally low production period immediately prior to sampling (within one week) may skew results of the sampling. GP Toledo must ensure a measurable amount of flow from all WWTP influents is occurring during sampling. GP Toledo has indicated that the following influent flows are "typical":
   i. Paper Mill: 9.0 million gallons per day (MGD)
   ii. Recausticizing Sewer: 0.5 MGD
   iii. Pulp Mill: 2.7 MGD
   iv. Pulp Mill Foul Condensate: 0.7 MGD

e. Unusual conditions or operational changes may include, but are not limited to:
   i. Liquor spills
   ii. Startup or shutdown of mill equipment
   iii. Changes to pond configuration or operation (such as aeration changes)
   iv. Pond dredging activities

f. All liquid samples must be collected during the same calendar day. Collection of quarterly samples must be collected on the same calendar day as the monthly samples.

g. GP Toledo must address known seasonal variations in the WWTP effluents based on changes in mill production.

h. Sample collection must begin within 60 days of DEQ's approval of the sampling plan.

i. Analytical reports must be submitted to DEQ within 60 days of sampling.

2. Submit to DEQ results of H2SSIM models for the WWTP which incorporate the revisions outlined below. The results of the H2SSIM models and updated Inventory are due within 60 days of completing the full year of requested liquid sampling.

   a. Based on guidance presented in TB 1000, GP Toledo must create 5 separate H2SSIM models, one for each basin of their wastewater treatment system as follows:
      i. Clarifier;
      ii. Thermal Ponds – Zones 1-3;
      iii. Load Level Pond – Zones 1-2;
      iv. Treatment Ponds – Zones 1-2; and
      v. Settling Pond – Zones 1-2.

      DEQ has included proposed model inputs for the model basins in Attachment B. Note, DEQ is not requesting that landfill leachate ponds (15-acre and 30-acre ponds) be added as basins in the H2SSIM model at this time. However, this may be reevaluated based on the results of the liquid sampling.

   b. Annual Emissions: GP Toledo must use the results of monthly liquid sampling along with paired meteorological information (ambient temperature and wind speed on date of sampling) to set up a total of 12 monthly H2SSIM models for each of the 5 WWTP basins. For each basin, determine the annual hydrogen sulfide emissions by averaging the total hydrogen sulfide emissions (in pounds per year) for the basin across the 12 models.

   c. Maximum Daily Emissions: For each basin (or component of the WWTP) GP Toledo should evaluate the results of the 12 monthly H2SSIM model runs and determine the run

with the highest hydrogen sulfide emissions. Use the H2SSIM output of total hydrogen sulfide emissions in units of grams per second to develop a maximum daily emission rate:

$$H_2S \text{ Emissions } \left[\frac{\text{lb}}{\text{day}}\right] = H_2S \text{ Emissions } \left[\frac{\text{g}}{\text{s}}\right] \times \frac{\text{lb}}{453.592 \text{ g}} \times \frac{86{,}400 \text{ s}}{\text{day}}$$

3. Submit to DEQ results of Water9 models for the WWTP which incorporate the revisions outlined below. The results of the Water9 models and updated Inventory are due within 60 days of completing the full year of requested liquid sampling.
    a. Update the existing Water9 analysis to incorporate the refined WWTP inputs developed for the H2SSIM analysis. The updates include:
        i. Confirm all WWTP components are included in the Water9 model and add additional components to match the actual configuration of the system. Also include screen components of WWTP.
        ii. Confirm all inputs streams to WWTP are included in the Water9 model.
        iii. Confirm WWTP parameters (such as pond dimensions, aerator parameters, temperature, pH) are consistent with those used in the H2SSIM model.
        iv. The Water9 model must also include the 15-acre and 30-acre ponds.
        v. Include updated liquid sampling data outlined in Specific Comment 1.b.
    b. Annual Emissions:
        i. Use the average results of liquid sampling for all influents. For those parameters collected monthly, use all monthly results in your analysis.
        ii. Use average meteorological data over the 12-month period.
    c. Maximum Daily Emissions:
        i. Use the maximum results of liquid sampling for all influents. For those parameters collected monthly, use all monthly results in your analysis.
        ii. Use maximum meteorological data over the 12-month period.

DEQ is requesting that you submit additional information to complete your Inventory. If you think that any of that information is confidential, trade secret or otherwise exempt from disclosure, in whole or in part, you must comply with the requirements in OAR 340-214-0130 to identify this information. This includes clearly marking each page of the writing with a request for exemption from disclosure and stating the specific statutory provision under which you claim exemption. Emissions data is not exempt from disclosure.

DEQ remains available to discuss this information request with you and answer any questions you may have. Failure to provide additional information, corrections, or updates to DEQ by the deadlines above may result in a violation of OAR 340-245-0030(1).

If you have any questions regarding this letter please contact me directly at (503-407-7596, heather.kuoppamaki@deq.oregon.gov), and I look forward to your continued assistance with this process.

Sincerely,

Heather Kuoppamaki, P.E.
Cleaner Air Oregon Project Manager

Encl: Figure 1
Attachment A – Required Sample Parameters and Analyses
Attachment B – Proposed H2SSIM Model Inputs

Cc: Maria Zufall, Georgia-Pacific
Logan Vaughan, Georgia-Pacific
Sarah Hu, Georgia-Pacific
Micah Leis, Georgia-Pacific
Michael Eisele, DEQ
Zach Loboy, DEQ
Amy DeVita-McBride, DEQ
J.R. Giska, DEQ
File

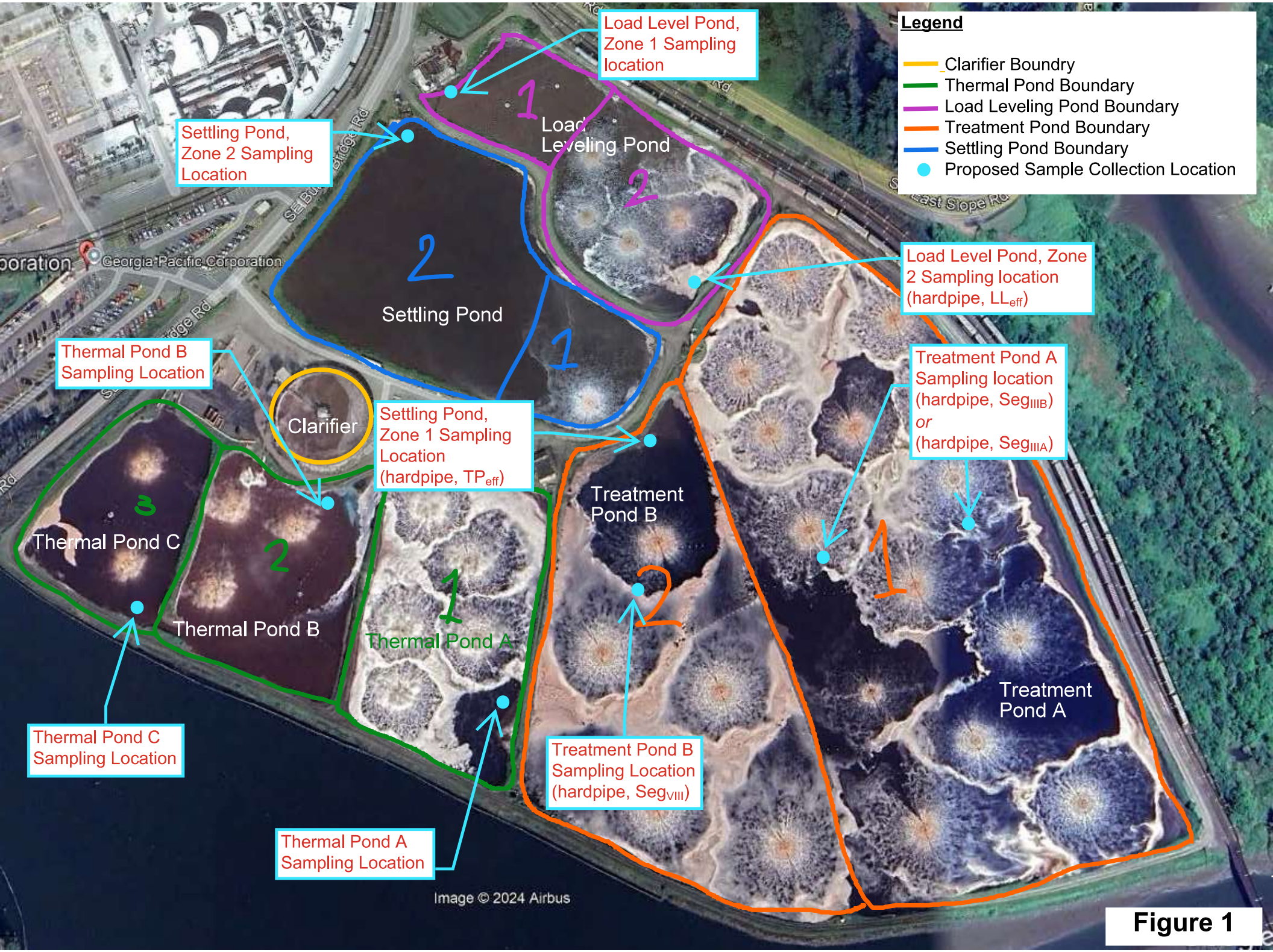
Legend
Clarifier Boundry
Thermal Pond Boundary
Load Leveling Pond Boundary
Treatment Pond Boundary
Settling Pond Boundary
Proposed Sample Collection Location
Load Level Pond, Zone 1 Sampling location
Settling Pond, Zone 2 Sampling Location
Load Leveling Pond
Settling Pond
Load Level Pond, Zone 2 Sampling location (hardpipe, LL$_{eff}$)
Thermal Pond B Sampling Location
Clarifier
Settling Pond, Zone 1 Sampling Location (hardpipe, TP$_{eff}$)
Treatment Pond A Sampling location (hardpipe, Seg$_{IIIB}$) or (hardpipe, Seg$_{IIIA}$)
Thermal Pond C
Thermal Pond B
Thermal Pond A
Treatment Pond B
Treatment Pond A
Thermal Pond C Sampling Location
Treatment Pond B Sampling Location (hardpipe, Seg$_{VIII}$)
Thermal Pond A Sampling Location
Georgia-Pacific Corporation
Image © 2024 Airbus

Figure 1

Attachment A

Required Sample Parameters and Analyses

Sample Location	Monthly Sampling						Quarterly Sampling	
	Flow	Total Sulfide	Sulfate	Dissolved Oxygen	Temperature	pH	[1]	[2]
Treatment System Influent Samples								
Clarifier Inlet or Paper Mill Effluent	X	X	X	X	X	X	X	X
Thermal Pond A Influent (combined) ***or*** Clarifier Effluent + Recaustizing Sewer Effluent + 30-Acre Pond Effluent	X	--	--	--	--	--	--	--
Recaustizing Sewer Effluent	X	--	--	--	--	--	X	X
30-Acre Pond Effluent	X	--	--	--	--	--	X	--
15-Acre Pond	X						X	--
Load Level Pond Influent (combined) ***or*** Thermal Ponds Effluent + Pulp Mill Effluent	X	--	--	--	--	--	--	--
Pulp Mill Effluent	X	--	--	--	--	--	X	X
Treatment Pond A Influent (combined) ***or*** Load Level Pond Effluent + Pulp Mill Foul Condensate	X	--	--	--	--	--	--	--
Pulp Mill Foul Condensate	X	--	--	--	--	--	X	X
Treatment System Samples								
Thermal Pond A	--	X	X	X	X	X	--	--
Thermal Pond B	--	X	X	X	X	X	--	--
Thermal Pond C	--	X	X	X	X	X	--	--
Load Level Pond, Zone 1	--	X	X	X	X	X	--	--
Load Level Pond, Zone 2 (hardpipe, LL_{eff})	--	X	X	X	X	X	--	--
Treatment Pond A (hardpipe, Seg_{IIIA})[3]	--	X	X	X	X	X	--	--
Treatment Pond A (hardpipe, Seg_{IIIB})[3]	--	X	X	X	X	X	--	--
Treatment Pond B (hardpipe, Seg_{VIII})	--	X	X	X	X	X	--	--
Settling Pond, Zone 1 (hardpipe, TP_{eff})	--	X	X	X	X	X	--	--
Settling Pond, Zone 2	--	X	X	X	X	X	--	--

[1] Sample and analyze for the following parameters on a quarterly basis for one year (4-sampling events):

- Ammonia (Method 350.1).
- Purgeables by GC/MS (Method 624.1).
- Base/Neutrals and Acids by GC/MS (Method 625.1).
- Carbonyl Compounds by HPLC (Method 8315A).

[2] Sample and analyze for the following parameters on a quarterly basis for one year (4-sampling events):

- Per- and Polyfluoroalkyl Substances (PFAS) by LC-MS/MS (Method 1633A).

[3] GP Toledo may sample at either Seg_{IIIA} or Seg_{IIIB} hardpipe locations.

Attachment B

Proposed H2SSIM Model Inputs

H2SSIM Input Parameter	Modeled Unit									
	Clarifier	Thermal Ponds			Load Level Pond		Treatment Ponds		Settling Pond	
		Zone 1 (Pond A)	Zone 2 (Pond B)	Zone 3 (Pond C)	Zone 1	Zone 2	Zone 1 (Pond A)	Zone 2 (Pond B)	Zone 1	Zone 2
Data Type 1. Site Identification										
Basin Name	Clarifier	Thermal Ponds			Load Level Pond		Treatment Ponds		Settling Pond	
Data Type 2. Model Zone Information										
No. of Zones	N/A	3			2		2		2	
Zone Location of Hardpipe	N/A	--			--		[1]		N/A	
Type of Basin	PC	ASB			ASB		ASB		ASB	
Data Type 3. Load Characteristics										
Main Effluent										
Flow	Clarifier Inlet or Paper Mill Effluent [2]	Clarifier Effluent + Recaustizing Sewer Effluent + 30-Acre Pond Effluent [3]			Thermal Pond Effluent + Pulp Mill Effluent [4]		Load Level Pond Effluent & Pulp Mill Foul Condensate [5]		Treatment Pond Effluent [6]	
Total Sulfide		Thermal Pond A [7]			Load Level Pond, Zone 1 [8]		Treatment Pond A [9]		Treatment Pond B Outlet [10]	
Sulfate										
Hardpipe										
Flow	N/A	--			--		Pulp Mill Foul Condensate [1]		N/A	
Total Sulfide	N/A	--			--				N/A	
Sulfate	N/A	--			--				N/A	
Data Type 4. Atmospheric Conditions										
Windspeed	Average annual or maximum daily.									
Ambient Temperature	Average annual or maximum daily.									
Data Type 5. Zone Physical and Chemical Conditions										
Dissolved Oxygen	Clarifier Inlet or Paper Mill Effluent [2]	Thermal Pond A [7]	Thermal Pond B [11]	Thermal Pond C [11]	Load Level Pond, Zone 1 [8]	Load Level Pond, Zone 2 [11]	Treatment Pond A [9]	Treatment Pond B [11]	Treatment Pond B Outlet [10]	Settling Pond Zone 2 [11]
Temperature										
pH										
Redox Condition	Anoxic	Aerobic	Aerobic	Aerobic	Aerobic	Aerobic	Aerobic	Aerobic	Anoxic	Anoxic
Length	To be determined by GP Toledo based on system design.									
Width	To be determined by GP Toledo based on system design.									
Depth	To be determined by GP Toledo based on system design.									
Mixing	None	None [12]	None [12]	N/A	Low [13]	N/A	None [12]	N/A	Low [13]	N/A

Attachment B

Proposed H2SSIM Model Inputs

H2SSIM Input Parameter	Modeled Unit									
	Clarifier	Thermal Ponds			Load Level Pond		Treatment Ponds		Settling Pond	
		Zone 1 (Pond A)	Zone 2 (Pond B)	Zone 3 (Pond C)	Zone 1	Zone 2	Zone 1 (Pond A)	Zone 2 (Pond B)	Zone 1	Zone 2
Number of Aerators	To be determined by GP Toledo based on system design.									
Total Horsepower	To be determined by GP Toledo based on equipment specifications.									
Impellor Size	To be determined by GP Toledo based on equipment specifications.									
Impellor RPM	To be determined by GP Toledo based on equipment specifications.									
Diffused Air Flow	To be determined by GP Toledo based on equipment specifications.									
Weir Height	To be determined by GP Toledo based on system design.									

[1] If flow from Pulp Mill Foul Condensate enters Treatment Ponds in different location from Load Level Pond Effluent, include as hardpipe flow in model.

[2] Based on review of information provided by GP Toledo, the only influent to the Clarifier is from the Pulp Mill. If this assumption is correct, either sampling location is appropriate and can be selected based on convenience of sampling. If the clarifier has multiple inlets, sample must be collected after flows are combined.

[3] Flow can be calculated as either sum of flows for each influent to Thermal Pond A or measured at inlet pipe to Thermal Pond A if the flows combine prior to inlet to pond.

[4] Flow can be calculated as either sum of flows for each influent to the Load Leveling Pond or measured at inlet pipe to Load Leveling Pond if the flows combine prior to inlet to pond.

[5] Flow can be calculated as either sum of flows for each influent to Treatment Pond A or measured at inlet pipe to Treatment Pond A if the flows combine prior to inlet to pond. If Pulp Mill Foul Condensate enters the Treatment Pond at alternate location should be entered as in the "Hardpipe" category.

[6] Assume flow to settling pond is the same as flow in Treatment Ponds. If additional flows enter at Settling Pond, this will need to be reassessed.

[7] Proposed sample location indicated on Figure 1. If all influents combine prior to inlet to Thermal Pond A, can alternatively collect sample from the hardpipe.

[8] Proposed sample location indicated on Figure 1. If all influents combine prior to inlet to Load Leveling Pond, can alternatively collect sample from the hardpipe.

[9] Proposed sample location indicated on Figure 1. If all influents combine prior to inlet to Thermal Pond, can alternatively collect sample from the hardpipe.

[10] Proposed sample location indicated on Figure 1. Assuming no additional flows enter the settling pond, propose sampling at hardpipe sampling location at outlet of Treatment Pond B.

[11] Proposed sample location indicated on Figure 1.

[12] Mixing defined as "none" due to presence of physical boundary (weir or curtain) between the zones.

[13] Mixing defined as "low" since one zone is quiescent.