UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF TEXAS
VICTORIA DIVISION

SAN ANTONIO BAY ESTUARINE WATERKEEPER, et al.,	)	
Plaintiffs,	)	**CIVIL ACTION NO. 6:17-cv-00047**
vs.	)	
FORMOSA PLASTICS CORP., TEXAS, et al.,	)	
Defendants.		

DECLARATION OF AIZA JOSE-SANCHEZ
IN SUPPORT OF PLAINTIFFS' MOTION
TO ENFORCE CONSENT DECREE REGARDING
OPERATION OF WASTEWATER SAMPLING MECHANISM

I, Aiza Jose-Sanchez, hereby attest and affirm as follows, under penalty of perjury:

1. "My name is Aiza Jose-Sanchez. I am at least twenty-one years old, of sound mind, capable of making this affidavit, have not been convicted of a felony or a misdemeanor involving moral turpitude, and am fully competent to make this declaration.
2. The purpose of this declaration is to describe the Wastewater Sampling Mechanism (WSM) and to explain how the two disputed issues affect the accurate and precise determination of when the WSM results show plastic pellets,

powder, and flakes (Plastics) in a sample of the effluent Formosa is discharging into Lavaca Bay.

3. The first dispute is how to manage samples taken from the automatic sampling device, which is designed to detect plastic powder. The automatic sampler expels some of Formosa's treated effluent into individual 900 ML (milliliter) bottles when the trigger concentration of total suspended solids (currently set at 40 mg/L) is detected by a continuous monitoring probe at the WSM. Those samples of visible powder are taken as many times a day as the high concentrations are measured, except that a period of 180 minutes is allowed in between samples. As The sampler also takes a sample 30 minutes after the suspended solids event, requested by Formosa, and a daily sample, currently scheduled for 7 a.m., which is technically necessary to wet the device to prevent the accumulation of biological matter.

4. In my opinion, the individual samples from the automatic sampler should be maintained separately or combined into a daily sample as evidence of Plastics discharged on the day of the sample. Formosa proposes that the sample bottles from different days be combined. If samples are to be composited, they should be so within separate days, i.e., a composite sample should include only samples collected within the same day.

5. The second dispute is whether the Monitor can use its discretion to take a manual sample of the effluent when the water in the visual Sight Glass looks abnormal to the Monitor. Formosa objects to the Monitor taking any manual samples, unless the WSM is not functioning.

A. Background: WSM Construction and Key Components

6. I have an MS and PhD in civil engineering with expertise in water resources and environmental engineering from the University of Texas at Austin and served as an expert witness in this case for San Antonio Bay Estuarine Waterkeeper and Diane Wilson (Waterkeeper). In my 25 years as an engineer, my professional work has focused on wastewater and stormwater, and my clients have been included the cities Dallas, Fort Worth, Houston, Austin, Arlington, San Antonio and several smaller cities and counties all across Texas. I had never worked as an expert witness before this case. After this case was settled, I consulted with an organization in South Carolina about plastics being discharged into Cooper River and eventually into Charleston Harbor.

7. Before this case was settled, I proposed to Waterkeeper a technical mechanism to physically monitor for Plastics in Formosa's treated effluent that is being discharged into Lavaca Bay through Outfall 001. I did experiments and set up a complete pilot test of how such a sampling mechanism would be designed. In the final Consent Decree, Formosa agreed that I would design the WSM to

sample for Plastics in its Outfall 001 effluent discharge. (I have filed for a US patent on the design of the WSM, which is pending and is Application Number 63/164,609, Attorney Docket No.21-002756-03. Final utility patent is pending completion of a legal agreement between Formosa and myself.)

8. The WSM is an approximately 7,000 square foot facility. The WSM is located on Formosa's property a little less than a mile southwest the intersection of SH 35 and Hwy 1593, across the street from Formosa's main facility. Photographs A-D below show the construction the WSM.

Photograph A
Construction of WSM foundation
October 27, 2020

Photograph B
Construction of WSM Framing
November 17, 2020

Photograph C
Interior Construction of WSM
December 28, 2020

Photograph D
Inside the WSM
June 11, 2021

9. The WSM is physically situated right above the 2-mile pipeline that transports Formosa's treated effluent to Outfall 001. Formosa continuously discharges treated effluent into Lavaca Bay. The WSM takes a continuous sample from the pipeline through a valve on the 001 pipeline. The valve diverts a 3.7% sample of Formosa's effluent based on the flowrate to the WSM. The effluent diverted to the WSM is a small representative sample of the wastewater Formosa is discharging into Lavaca Bay. Formosa's actual discharged effluent into the Bay

will have the same components and concentrations as those in the WSM samples, but the loads of discharge are larger into the Bay. Photograph E shows the 30-inch discharge valve for outfall 001, along with the valves and pipes constructed to take the sample for the WSM.

Photograph E
30-in Outfall line and Sampling valves and pipes to the WSM
October 15, 2020

10. The construction, commissioning, and calibration of the WSM has been a cooperative effort between Formosa's engineers and me. The joint party engineering team has also worked cooperatively on drafting Standard Operating Procedures (SOPs) and Inspection Forms to instruct the Monitor how to operate

the WSM. Three disputed issues remain,[1] and once the disputed issues about the automatic sampler, manual sampling and laboratory testing are resolved, they will be finalized into the SOPs. A copy of the Draft SOPs is attached to this declaration as Exhibit A.

11. I designed the WSM to have redundancies so that it would thoroughly and accurately record and sample information about Formosa's discharge into Lavaca Bay. The main detection mechanisms are a net that effluent continuously flows through to trap plastic pellets; a large concrete "bathtub" through which effluent flows and within which a ring of Plastics debris could be deposited; an automatic sampling device that expels a sample of effluent into a jar either whenever the concentration of total suspended solids in the slip stream reaches an agreed upon threshold or that could do so randomly; and a sight glass equipped with a manual valve to collect samples. Cameras are also located in the WSM so the facility can be checked remotely. Photographs F-M show these components of the WSM.

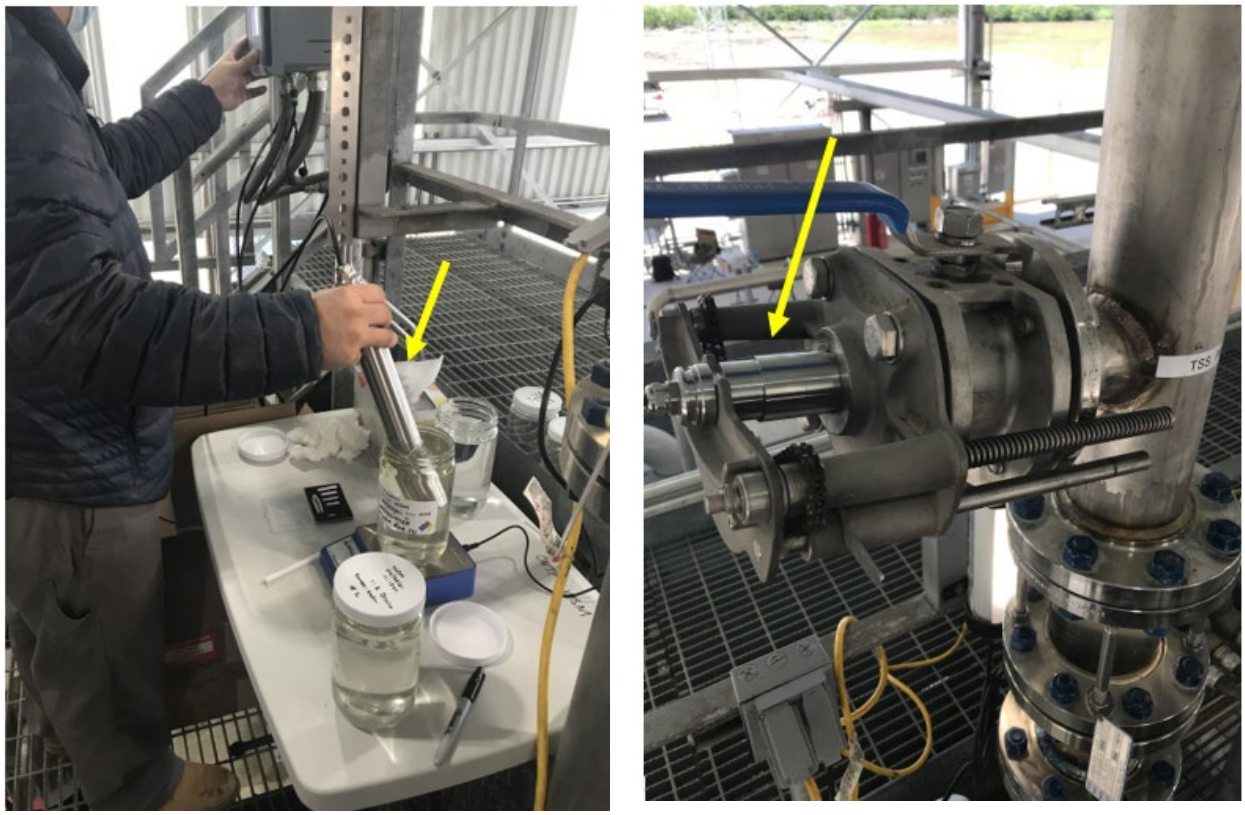
[1] A new issue emerged regarding the prompt hiring of a laboratory that Formosa requests test the powder to confirm that it is Plastic. The laboratory issue is in Dispute Resolution with an October 1 deadline and could also be brought to the Court.

Photograph F
Pellet capture net at WSM
August 20, 2021

Photograph G
Powder and Pellet Sump or "Bathtub" at WSM
February 2, 2021

Photograph H
Plastics floating in Concrete "Bathtub"
June 30, 2021

Photograph I
Plastics floating in Concrete "Bathtub"
June 4, 2021



Photograph J
TSS Automatic Sampling Device - During Calibration (Left) and Mounted (Right)
April 23, 2021, and May 5, 2021, respectively

Photograph K
Sight Glass at the WSM with Flow
August 20, 2021

Photograph L
Sight Glass at the WSM
December 30, 2020

Photograph M
View from WSM During Construction Cameras of the WSM
December 30, 2020

12. As of September 3rd, the pellet capture net has captured pellets every time the parties have opened the net except for one time, and Formosa has reported a

Consent Decree violation and paid an agreed upon mitigation fee. Starting March 1, 2021, pellets have been captured in the net on 15 occasions. Photos of some of the times pellets have been captured in the net are Photographs N-P.

Photograph N
Pellets in Pellet Capture Net at WSM
June 11, 2021

Photograph O
Pellets in Pellet Capture Net at WSM
June 30, 2021

Photograph P
Thousands of Pellets in Pellet Capture Net at WSM – In the Top Two and Left Bottom (Left) and Recovered in Jar (Right Bottom)
July 30, 2021

13. The concrete bathtub is an effective device to visually see the line created from plastic powder, just like a bathtub ring. To properly use the bathtub, it must be completely cleaned after each determination of a discharge. Formosa contends that the bathtub cannot be completely cleaned and objects to its use as a mechanism to determine Consent Decree violations. Waterkeeper disagrees about cleaning of the bathtub but has compromised and agreed that a plastic ring in the bathtub will not trigger Consent Decree violations at this time.

B. Automatic Sampling Issue

14. Automatic sampling is a common and proven technique used in the wastewater and stormwater industry for diverse applications. For example, in the wastewater industry, automatic sampling maybe used to monitor the concentration of a given constituent and control the characteristics of the effluent to prevent violations or to control chemical addition during the treatment process. For stormwater, automatic sampling has been a common application to either allow compliance with first flush sampling rules which typically ask the permitee to sample outfalls following the first 15 minutes or so of the rain event; or to set water quality goals. In my experience, the technologies have been well proven to the extent that regulatory agencies recognize and approve the use of such devices for compliance purposes. For example, I have utilized an automatic sampler very similar to the one utilized for Formosa for a stormwater compliance program that

was developed for the North Central Council of Government some years ago and continues in effect for the cities of Arlington, Dallas, Fort Worth, Garland, Irving, Mesquite and Plano.[2] It was based on my familiarity with the application that I decided to use the automatic sampler as part of my design of the WSM for Formosa.

15. The automatic sampling device operates daily 24 hours a day and expels water into a 900 mL sample jar, collecting a 600 mL sample, when the concentration of total suspended solids in the effluent reaches a predetermined threshold, currently 40 mg/L. The automatic sampling device could also randomly expel samples, but the current operation is to use total suspended solids at the trigger.

16. As requested by Formosa, the sampler also takes what all parties mistakenly have called a "flush" sample 30 minutes after a total suspended event. The word flush has been improperly used because it implies that the water in the system has higher pressure, velocity, or volume, none of which applies. Any sample by the automatic sampler is representative of the effluent being discharged by Formosa, as they all are taken under identical physical settings. Any sample 30 minute after a total suspended event is also a representative sample.

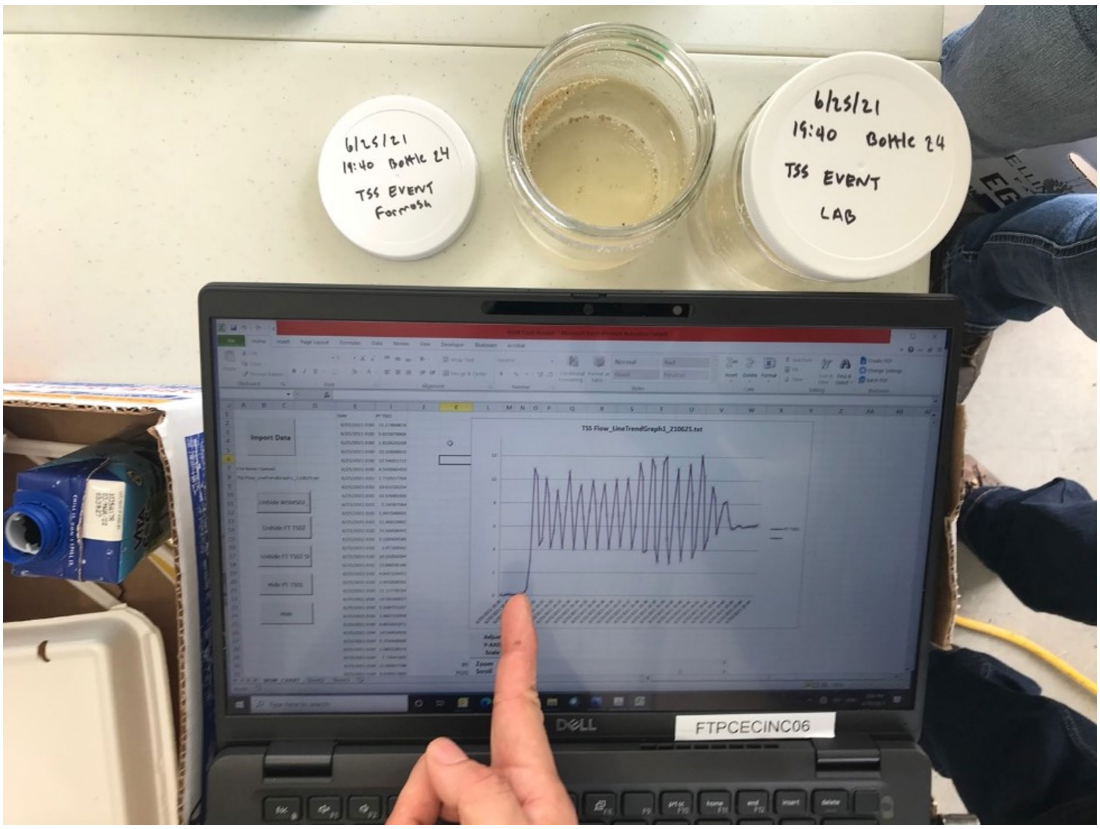
[2] More information about this program can be found at: https://www.nctcog.org/envir/watershed-management/stormwater/monitoring.

17. The sampler also takes a daily sample, currently scheduled for 7 a.m. At a minimum, one sample is taken a day. This daily sample is also a representative sample of Formosa's discharge through Outfall 001.

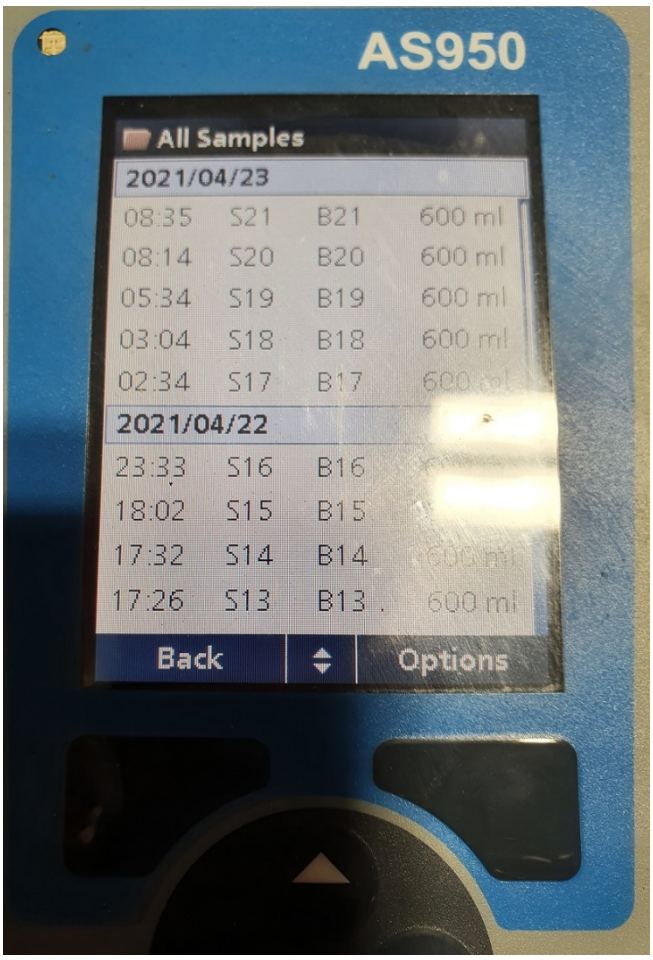
18. In the process of trying to find independent labs, I sent one sample from June 4 from the automatic sampler to the lab Dr. Zhanfei Liu at the University of Texas Marine Science Institute at Corpus Christi. Dr. Liu identified the floating solids as Plastics, specifically high-density polyethylene.

19. The sampling device records the date of the sample in a Bottle Log both at an electronic controller that operates the automatic sampler and at the Human Machine Interface (HMI) system that operates all controls at the WSM. The Bottle Log from the HMI is available both at the WSM and remotely through a cell phone for those, including the Monitor, who want to access to this information. Photographs Q-Y show the automatic sampling device, the computer readings of total suspended solids with the samples, the automatic sampler bottle logs (automatic controller and HMI), and some jars of samples taken by the automatic sampling device.

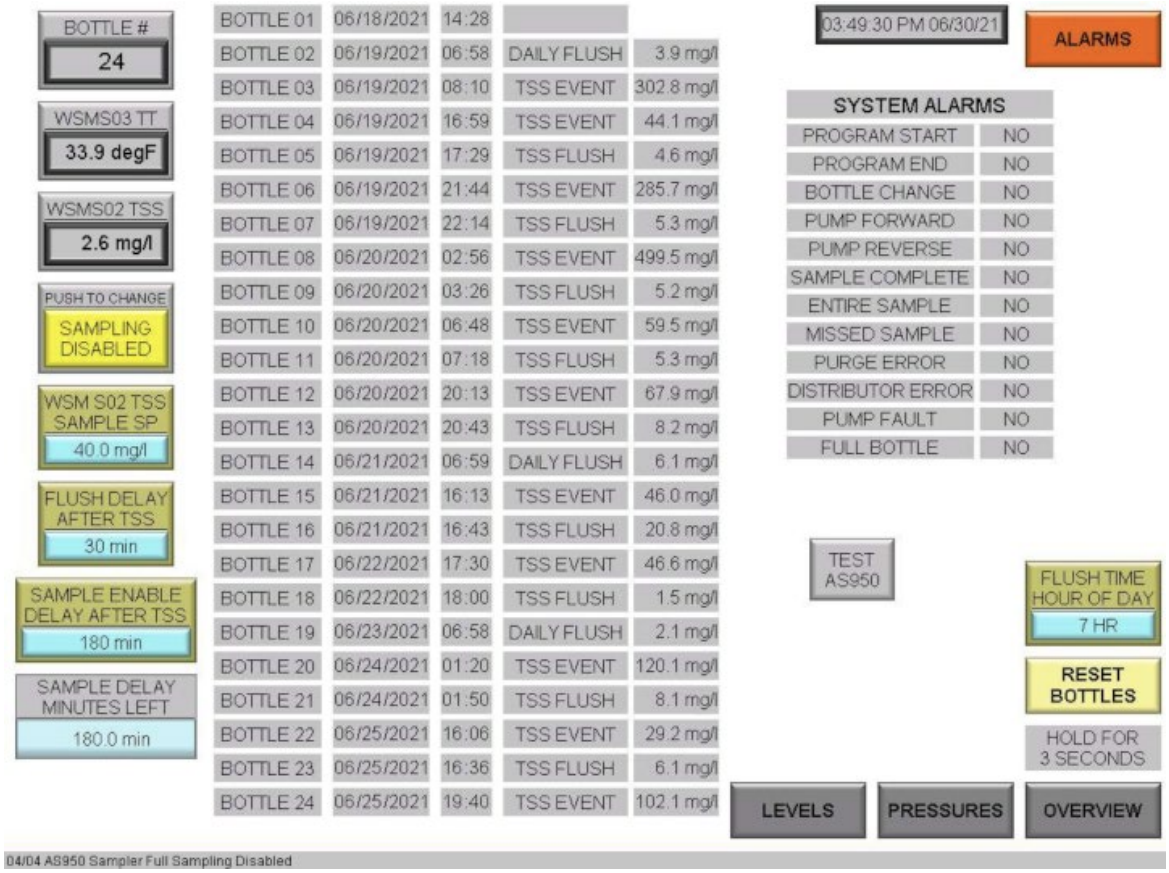
Photograph Q
Automatic Sampler -Closed (left) and Open (right – Controller shown on top)
March 5, 2021, and April 22, 2021



Photograph R
Verifying Flow Fluctuations and TSS Variations for a TSS Event Sample Based on Data Recordings
– Controller Zoom in Bottle Log (right) and Controller (left)
June 25, 2021, and April 22, 2021

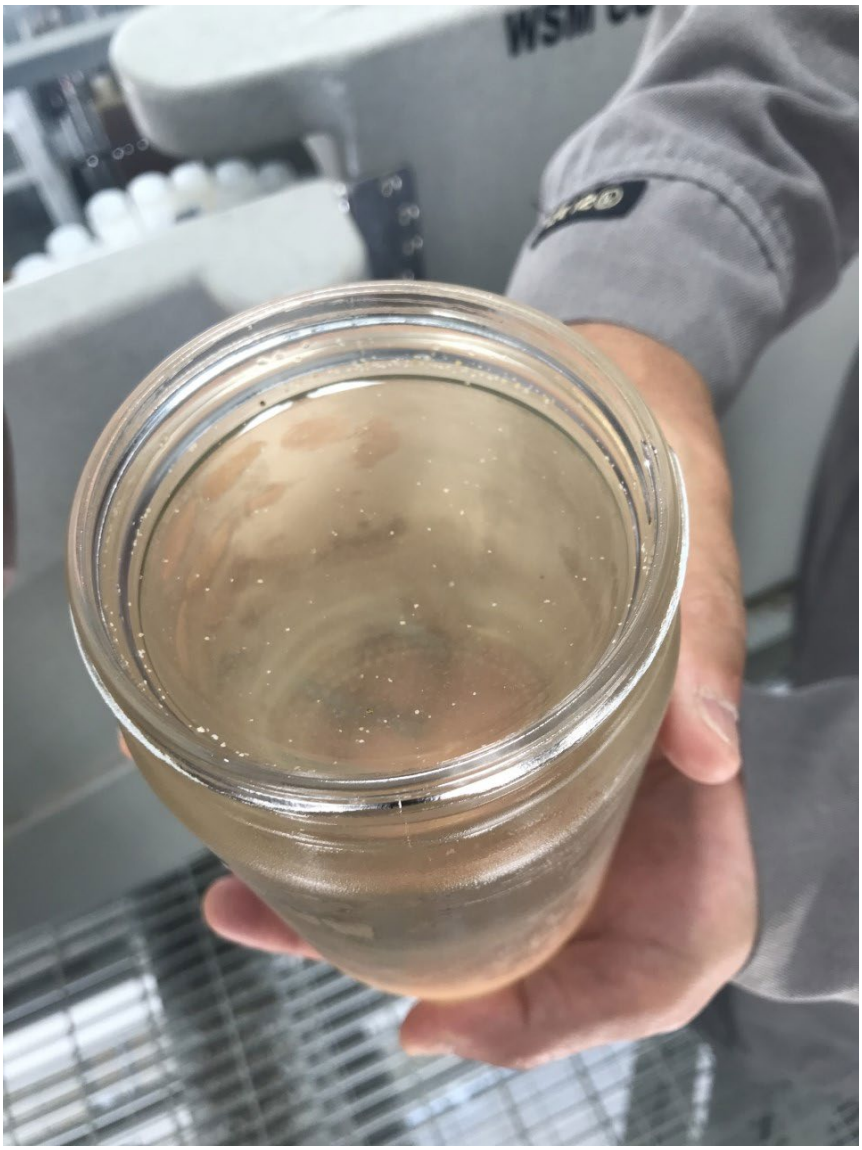


Photograph S
Autosampler Log from Autosampler Controller Showing Date and Time of Collected Samples
May 31, 2021

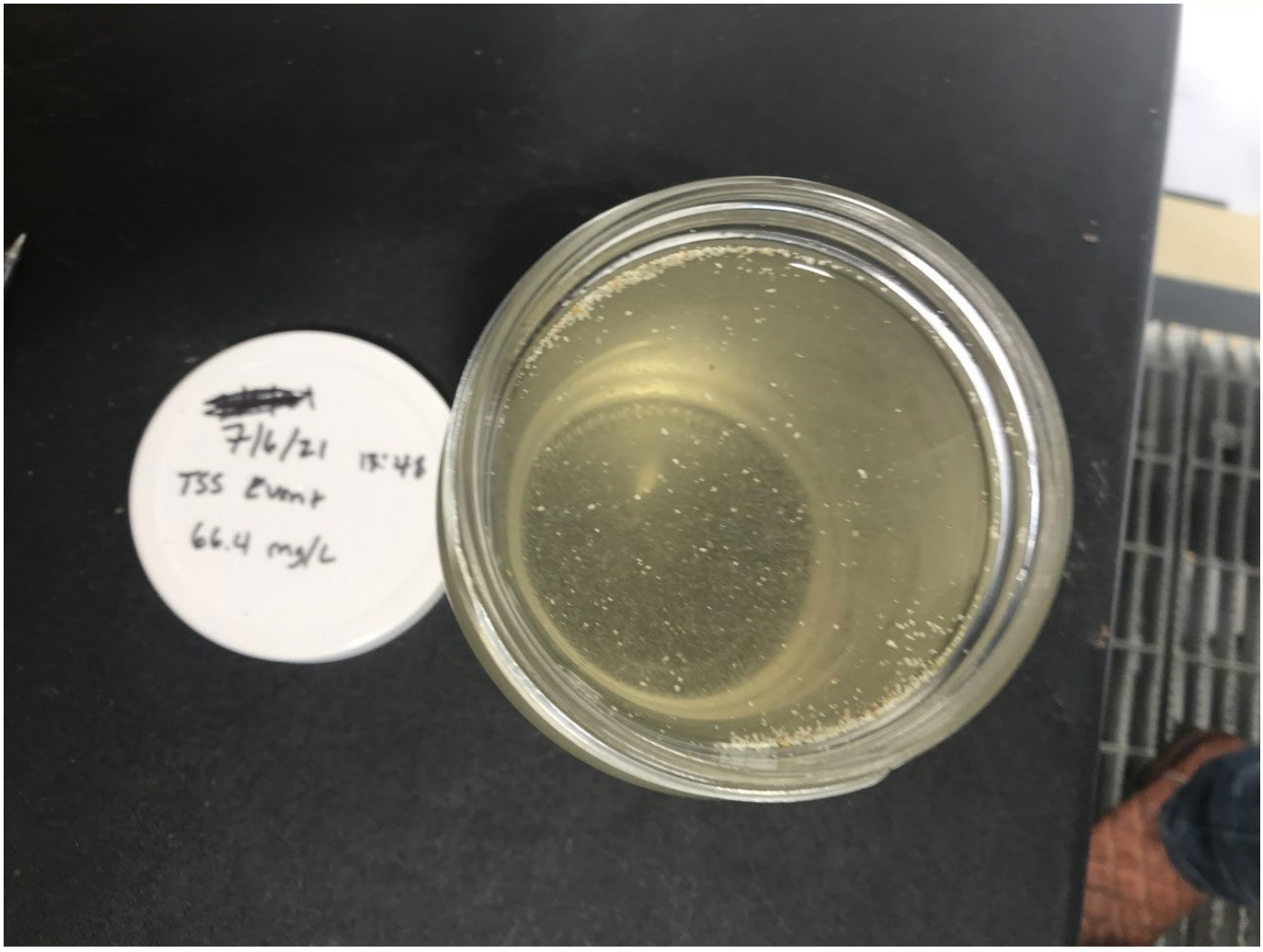


Photograph T
Autosampler Log from HMI Showing Date and Time of Collected Samples
(Info available at WSM and remotely via cell phone)
June 30, 2021

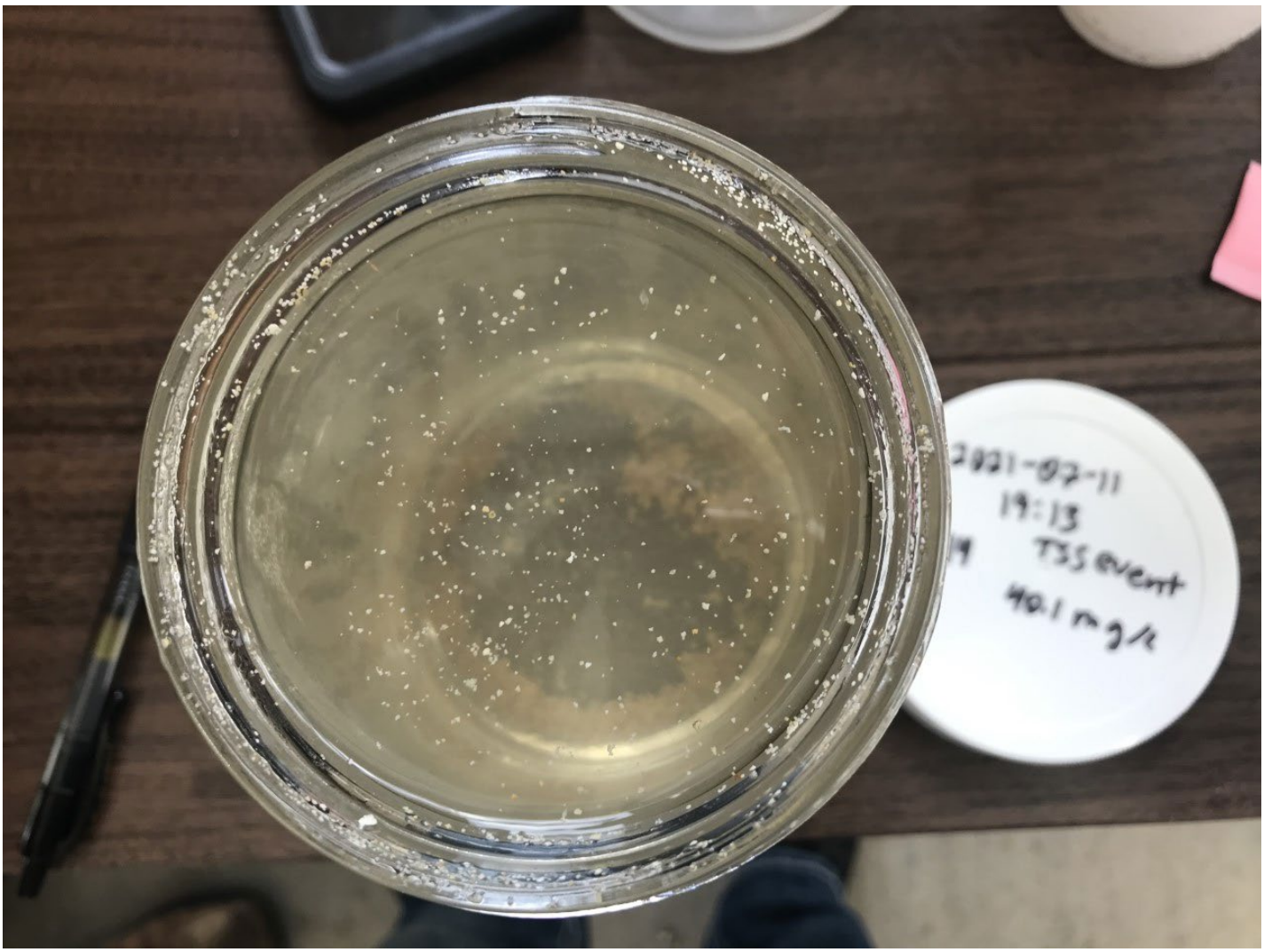
Photograph U
Plastics floating in Sample Jar from Automatic Sampling Device
May 5, 2021, 2021



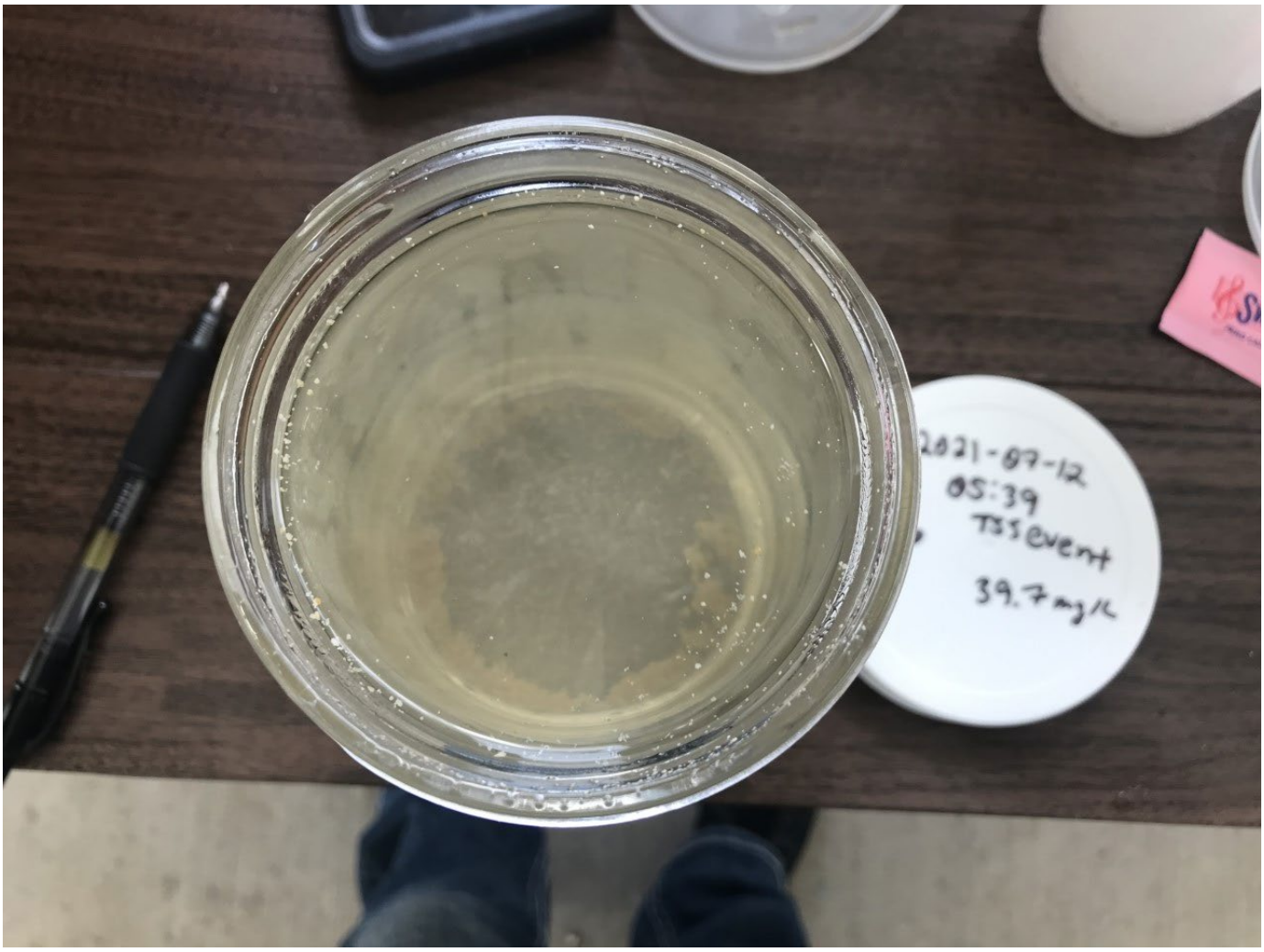
Photograph V
Plastics floating in Sample Jar from Automatic Sampling Device
June 11, 2021



Photograph W
Plastics floating in Sample Jar from Automatic Sampling Device
July 6, 2021



Photograph X
Plastics floating in Sample Jar from Automatic Sampling Device
July 11, 2021



Photograph Y
Plastics floating in Sample Jar from Automatic Sampling Device
July 12, 2021

20. The automatic sampler began functioning on December 2020, and the first samples were taken by the parties on June 11, 2021. Beginning on June 11, 2021, GEAR has collected the samples. The samples taken show visible Plastics in them, but Formosa has not acknowledged a violation of the Consent Decree. Formosa has contended that laboratory validation of Plastics in the sample was necessary. That validation can be done either by Formosa's in-house lab or an outside lab, and that issue remains disputed.

21. Plastic particles in the sample jars are identifiable by their physical characteristics: they are whitish, tiny solids that float and sparkle in light. Formosa has contended that the floating material in the samples should be tested to confirm that it is a plastic. Although the Waterkeeper believes that positive determination for Plastics (powder and flakes) could be done solely by visual means, it does not object to such testing being done by an independent lab. Under what circumstances it is necessary to send the sample to an independent lab is still being negotiated. It is possible that Formosa will take its own sample, test the sample and then simply not object that the floating solid is a Plastic. Waterkeeper has agreed that Formosa can retain a split sample of any Plastics from the automatic sampler.

22. There is no scientific reason to combine the samples from different days into a composite weekly or bi-weekly sample. The independent lab has informed that

parties that the volume in a sample jar is sufficient to assess whether floating solids are Plastics.

23. The automatic sampler identifies every day that there is a potential Consent Decree violation, even on days that the Monitor was not physically at the WSM. The automatic sampler produces a full and accurate record of potential plastics in Formosa's effluent. If the sampling shows Plastics in the discharge on two different days, then combining the daily samples into one jar will lead to inaccurate results, because the information about which day there was a violation would not be available. Further, the data in that hypothetical reflect that there were two violations, but by combining the samples, only one violation would be recorded.

24. The automatic sampler was designed to produce daily samples when the WSM shows potential Plastics in the effluent. That sampler has demonstrated its efficacy, the daily samples are scientifically valid, and the sampler should be used as designed.

25. The proposed language I drafted for the SOP, which, in my opinion, results in the most accurate and scientifically valid use of the automatic sampler on the WSM to detect Plastics in the effluent, is the following:

"Open the Bottle Cabinet and collect each sample into a vial and inspect for determination of Plastics. In the Inspection Form, note all bottles that appear

to have floating solids. Composite samples may be produced from the samples collected from the Autosampler, but only from those samples collected within the same date. Samples collected from different dates by the autosampler need to be kept separated from each other as they would represent distinct and separate events. GEAR will produce split samples from each collected sample or for each composite sample separating each into two and sending one sample to the lab, and the other one to Formosa."

The decision to produce composite samples is left to the Monitor (GEAR), based on the Monitor's evaluation of the circumstances of the sample, such as the visual appearance of the sample. The details of any compositing that occurs need to be documented.

C. Manual sampling by the Monitor

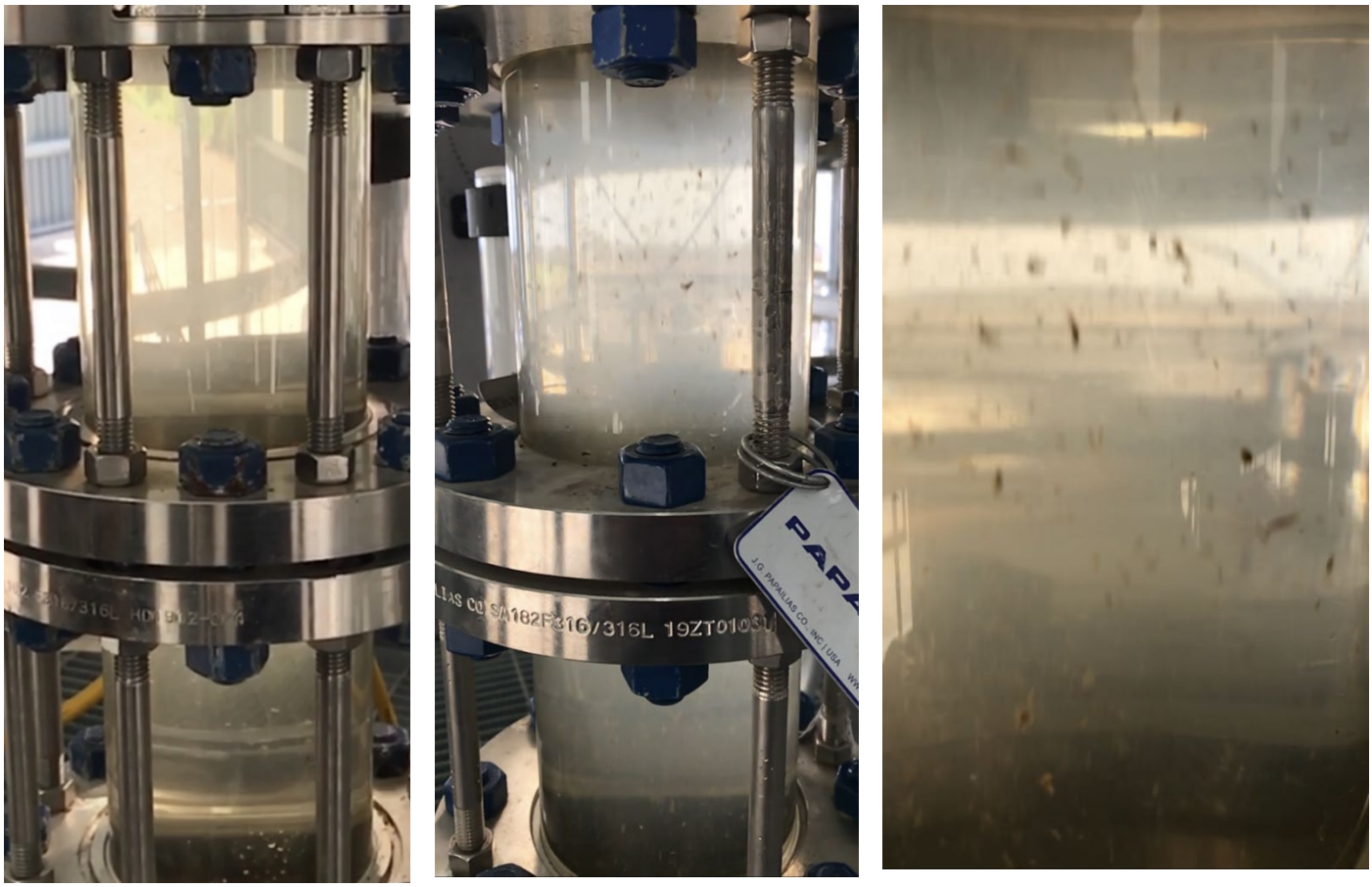
26. The second disputed issue relates to the Monitor's ability to take a manual sample. Manual samples are frequently used in wastewater and stormwater sampling. The WSM is designed with a manual sample port, which is a simple manual tap drain located along the 4-inch vertical column, upstream of the sight glass, on the first floor of the WSM (Photograph Z).

Photograph Z
Manual Tap Drain at the WSM to Collect Manual Samples
May 31, 2021

27. The WSM is designed so that the Monitor has the discretion to take a manual sample when effluent in the sight glass is suspicious, which could mean the water is murky, cloudy, and/or with noticeable solids. Likewise, the WSM allows the

Monitor to take a manual sample when the Monitor determines such a sample is necessary, such as when the WSM or the Autosampler is not operational or has failed to operate appropriately, or every time there is need to calibrate the TSS probe. Formosa has represented to me that manual sampling should only be done when (1) the WSM is non-operational, (2) the autosampler is non-operational, and/or (3) the TSS probe needs to be calibrated. As I understand it, Formosa does not approve taking a sample based on observation of effluent passing through the sight glass.

28. Photograph AA shows sight glass views with water suspicious enough to lead to likely sampling of the effluent. Please note that solids and not discoloration is the key factor in determining to take a sample.



Photograph AA
View of Sight Glass – Normal (Left), Heavy Solids Leading to Manual Sample (Middle), Close Up of Heavy Solids Leading to Manual Sample (Right)
August 20, 2021 (Normal), March 5, 2021 (Heavy)

29. The WSM was designed to have manual sampling to completely determine whether Formosa's effluent being discharged into Lavaca Bay has Plastics. For example, the monitoring probe that measures TSS concentration is unlikely to identify an object as large as a pellet as a suspended solid. The manual sample by the Monitor is another redundancy allowing the accurate recording of the characteristics of Formosa's wastewater. In my opinion, manual sampling is necessary to get a full and accurate record of the Plastics in Formosa's discharge.

30. The proposed language I drafted for the SOP, which, in my opinion, results in the most accurate and scientifically valid use of the manual samples at the WSM to detect Plastics in the effluent is the following:

> *"Check and note for visual presence of solids in the sight glass. (**Figures 45 and 46** have examples of unusual high presence of solids in sight glass.) If an unusual high presence of **solids** is observed, a manual sample should be collected to determine whether it needs to be sent to the lab for analysis. The manual sample should only be sent to the lab **if solids** float on the surface."*

31. Pursuant to 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and correct and that this declaration was executed on ____."

09/15/2021 [signature]

Exhibit A

to the Declaration of Aiza Jose-Sanchez

Contents

REVISION TRACKING

Revision No.	Date	Comment
Revision 0.0	01/24/21	SOP Outline by Aiza Jose Sanchez with Inspection Form
Revision 1.0	02/11/21	SOP Annotated by John Hyak
Revision 2.0	02/28/21	SOP Modified and Formatted Aiza Jose Sanchez with Updated Inspection Form
Revision 3.0	03/27/21	SOP Modified per John Hyak's and Serene (Ching-Wen) Chang's comments, incorporating Instrumentations (Southern Cross Consulting) and Calibration (Hach) Procedures.
Revision 4.0	04/14/21	Comments from Plaintiffs and input from GEAR regarding plastics lab analysis
Revision 5.0	04/23/21	Incorporating comments from John Hyak on 04.19.21 and after site visit of 4.22.21 and 4.23.21
Revision 6.0	05/02/21	Incorporating comments back from Amy Johnson 04.27.21 and input from Serene on 04.29.27 including photos
Revision 7.0	05/14/21	Re arrangement of document, added revisions and photos from last visit on 05/05/21
Revision 8.0 Preliminary	05/19/21	Containing all elements agreed upon technically until last visit 05/14/21
Revision 9.0 Preliminary	06/05/21	Containing all elements agreed upon technically until last visit 06/04/21
Revidion 10.0 Preliminary	06/21/21	Modifications after site visit on 06/18/21 including formatting and adding Gear names. Added collection of water sample from sump area. Added use of vacuum cleaner as part of the protocol for sump area. Correction of Composite samples for autosampler.

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1.0 Wastewater Sampling Mechanism (WSM) and Monitoring Activities

1.1 Description of WSM and Main Components

The Wastewater Sampling Mechanism (WSM) is designed and constructed as required by the Consent Decree (CD). The WSM allows for sampling and continuous monitoring of the treated wastewater being discharged to Lavaca Bay (Outfall 001). The WSM is designed for the monitoring of Plastics and includes several devices that allow for sampling of the treated wastewater stream and capture of solids, inclusive of Plastics, if present, in the treated wastewater flowing through the WSM. Plastics include visible pellets, flakes or powder. The different devices included in the WSM for detection of solids and Plastics include the following:

1. Total Suspended Solids (TSS) probe and Automatic Sampler that samples for the presence of solids, inclusive of Plastics, if present, by automatically collecting samples from the treated effluent after a TSS setpoint measurement threshold is measured by the TSS probe;
2. Pellet Capture Net, which continuously captures and retains solids, inclusive of Plastic pellets, flakes and, to an extent powder, if present, coming into the WSM;
3. Sight Glass and Manual Sample Collection Valve installed in the column of the WSM that allows visual detection of solids, inclusive of Plastics, if present, in the system, allows the Monitor to manually take a sample any time Plastics (pellets, flakes or powders) are observed, and allows monitoring of the proper operation of the system; and
4. Powder Bay Collection area downstream of the Pellet Capture Net, which retains solids, inclusive of Plastic powder and flakes, if present, and provides a visual indication of the presence of solids, inclusive of Plastic powders and flakes, if present, in the WSM.

A simplified graphic representation showing only the main components of the WSM is presented in **Figure 1**. It is important to note that the actual system is composed of many more valves, components and other devices that allow and make possible the proper operation of the overall system. However, a simplified version is shown here to allow an easier understanding for those dedicated exclusively to the monitoring of the WSM.

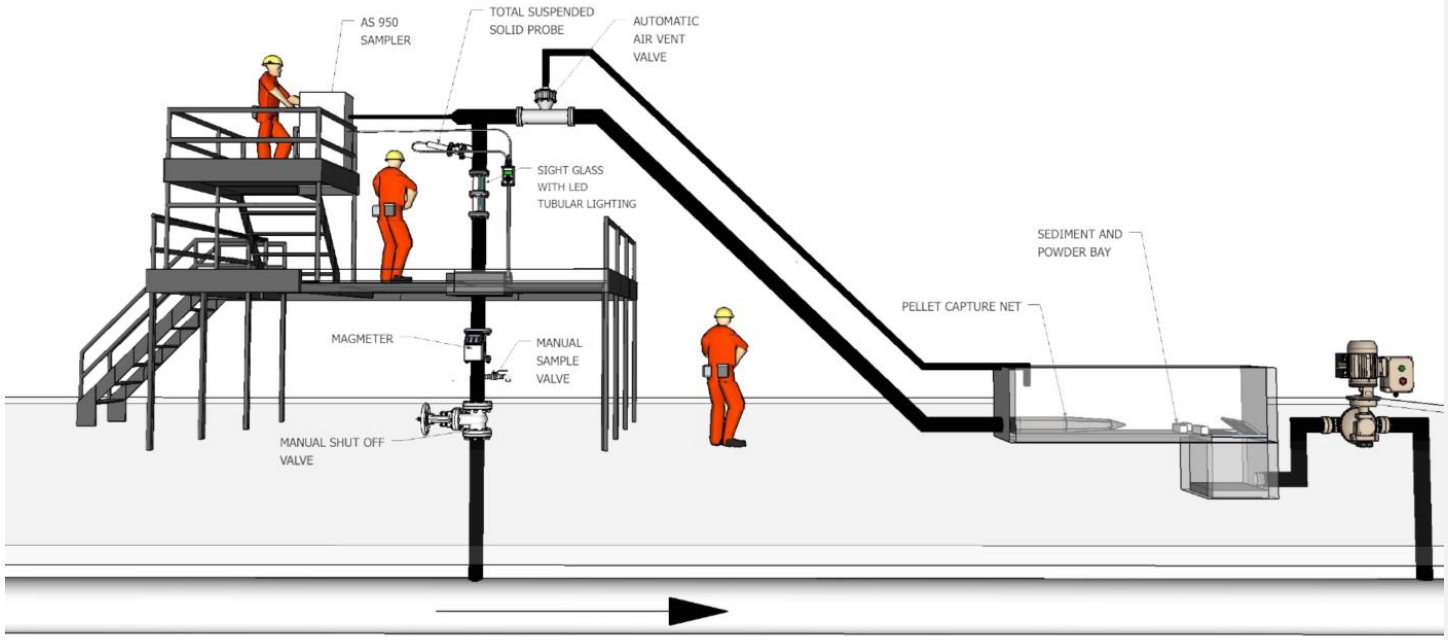


FIGURE 1 – SIMPLIFIED REPRESENTATION OF THE WASTEWATER SAMPLING MECHANISM (WSM)

The system is complemented by an automated **Human-Machine Interface** (HMI) dashboard that contains all the controls and operation instruments needed for the WSM to work effectively (**Figure 2**). The components that need attention for the monitoring of the WSM include the following:

- PT-TS09 - pressure of the 30" line coming into the sampling area
- PZT-TS10 –percentage opening of the 30" control valve
- PT-TS01 - pressure in the 4" line (sampling column - should always remain above zero)
- WSMS03TT – temperature in the automatic sampler (AS-950)
- WSMS02 - TSS reading per the TSS probe
- LZT-TS04 –percentage opening of 4" control valve (on sample line)
- LT-TS06 SP – level at the sump for the pellet capture area

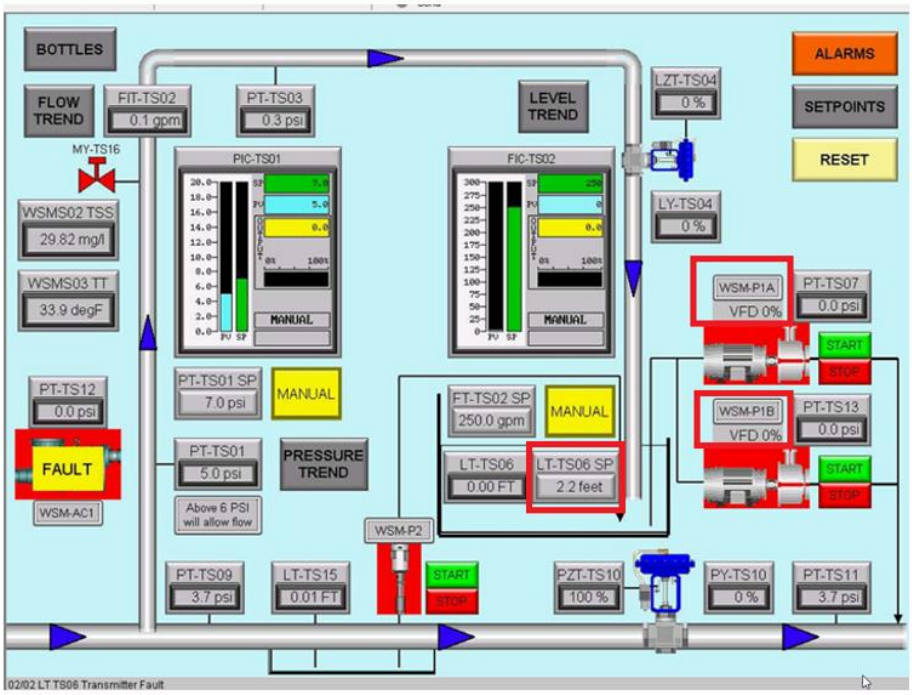


FIGURE 2 – HUMAN- MACHINE INTERFACE DASHBOARD FOR THE WSM

1.2 Team Structure: Roles and Responsibilities

GEAR is the "Monitor" of the WSM – They are responsible for monitoring of the WSM including operation and general maintenance of monitoring components of the WSM.

- Only these Designated Personnel from GEAR are authorized:
  - Anton Kindzirsky anton.kindzirsky@gmail.com mobile xxx.xxx.xxxx
  - Matthew Wateford
  - Jaden Finch
  - Jessica Palitz
  - William Wolfe

Commented [AJ1]: Added GEAR names. Version 10.

Formosa – Excluding those activities done by the Monitor, Formosa will be responsible for maintenance of major piping and pump equipment, and electronic and instrumentation systems[1] of the WSM. Maintenance will be conducted through a work order system which will be notified to Waterkeeper[2] and GEAR using a 48-h prior notice, as reasonable (excluding emergency events). The work orders will be scheduled so that GEAR is present, and a Waterkeeper representative has the option to attend at any point during the maintenance activities:

- Major maintenance items include replacement of any portion of the system that will require modification of the current set up. It does not include any routine change of netting in the capture pellet net system, cleaning of pellet capture net area/sight glass, or automatic sampler, calibration of TSS probe, or minor adjustments that may be conducted by GEAR.
- Any major event including system leaks, equipment malfunctions, overflowing, flooding, etc.
- Any major events such as major flooding, hurricanes, freezes, etc. that may require a general check of the system to ensure that it is properly operating.
- Work with Waterkeeper on matters pertaining to the WSM.
- Authorized Formosa Personnel include:

  - Those people designated to respond to emergencies, perform maintenance activities, involved in the day-to-day operation of the WSM
  - John T. Hyak GMO Department, Formosa Texas. Phone 361-652-7372, Email: johnhyak@ftpc.fpcusa.com. Primary contact person for Formosa on matters pertaining to the WSM.

WATERKEEPER – Waterkeeper will ensure the requirements of the CD are met.

- Dr. Aiza Jose Sanchez - Responsible for providing guidance in terms of calibration, improvement, modifications of the system as needed. This is a living document, and the protocol will need modification and adaptation as the system and the wastewater variations are better understood. Dr. Jose Sanchez's interaction will consist in further detailing the system to

[1] Maintenance activities will be conducted by Formosa's Maintenance Department under Formosa's electronic Work Order with a 48 h prior notice to Waterkeeper and with work to be conducted while GEAR is at the WSM. Notified parties will include Aiza Jose Sanchez or designee.
[2] Waterkeeper is used in this document to refer to Plaintiffs in the Consent Decree.

ensure that it properly works for the objectives detailed in the CD. Contact information: aizafernanda@hotmail.com 214-986-8746

- Representative from Waterkeeper– May escort Formosa on any activities within the WSM that Dr. Sanchez may not be able to attend and may accompany Dr. Sanchez.

1.3 Data Collection, Sample Collection and WSM Operation

For each of the observations and data collection made by GEAR date, time and specific location should be carefully recorded. Additionally, photographic documentation[3] is required as part of the recording for each event[4] upon discovery as well as documentation of the sample collected. Details are provided below.

1.3.1 HMI, Sump Pumps, Bypass Valves and Maintenance Valves

- Go to the HMI and look at the Overview screen and check for any alarms (any buttons in "yellow"). Note any alarms, take a screen shot from your phone app and press the "yellow" buttons or the "Reset" button to reset any alarms (Figure 3.1). Take another screen shot of the Overview screen once the system is without alarms from your phone app (Figure 3.2).
- From the Overview screen press the "Bottles" button and check for any alarms (any buttons in "yellow"). Take a screen shot from the app. (Figure 4).

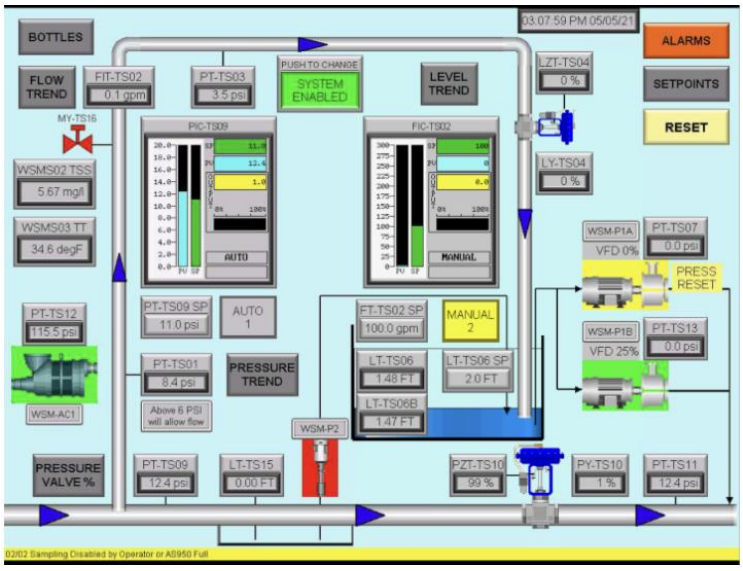


FIGURE 3– HUMAN- MACHINE INTERFACE OVERVIEW SCREENS SHOT FROM PHONE APP

[3] Documentation may be done by still photographs and/or videos any time photographic documentation is mentioned.

[4] An event is a discovery of Plastics, including pellets, flakes or powder.

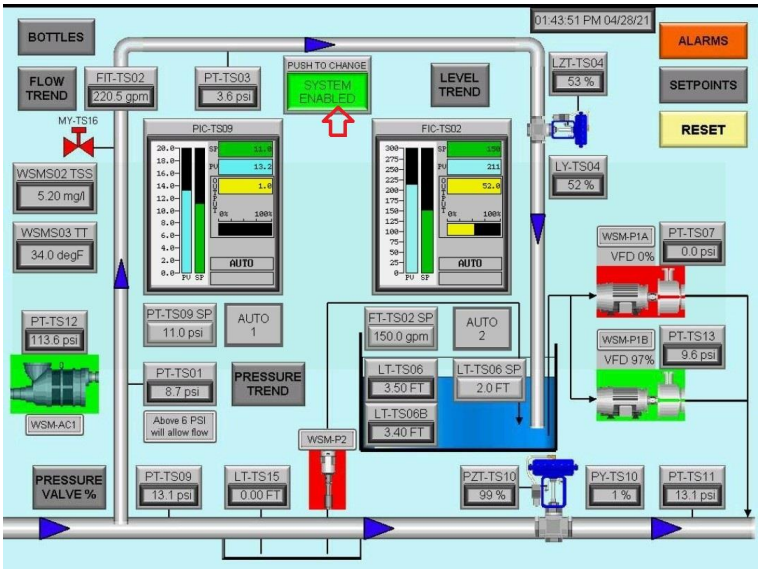


FIGURE 3.1– HMI OVERVIEW SCREENS SHOT FROM PHONE APP ONCE ALARMS HAVE BEEN TURNED OFF

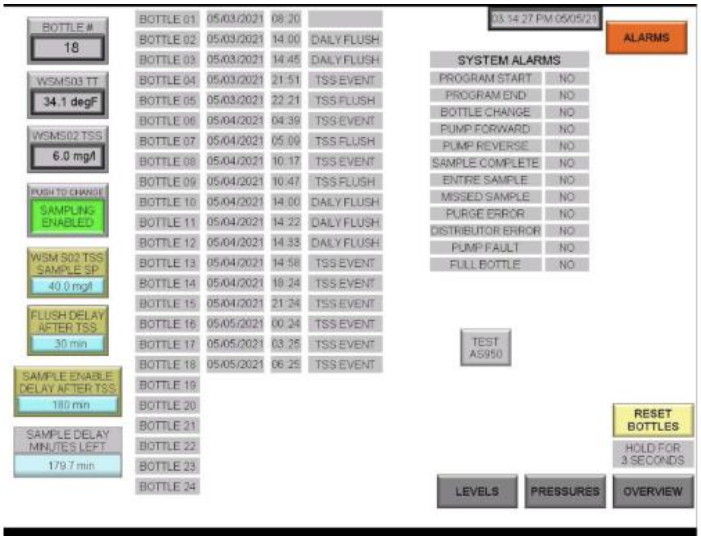
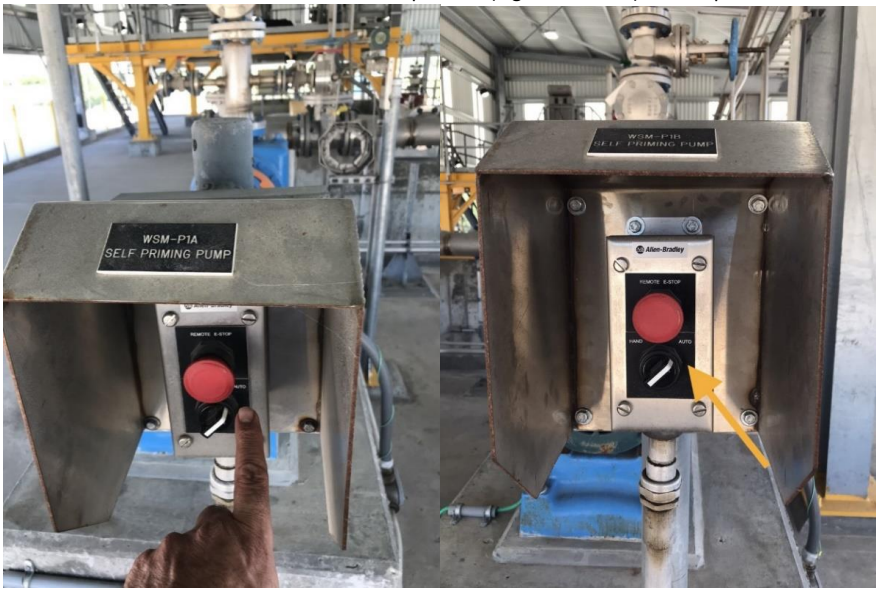


FIGURE 4– HMI BOTTLES SCREENS SHOT FROM PHONE APP

- Walk to the controllers for the WSM-P1A and WSM-P1B (near the pellet capture net area) and make sure both controllers are in the "Auto" position (Figures 5 and 6). Take a picture.



FIGURES 5 AND 6 – WSM P1A AND WSM PIB IN AUTO POSITION

- Go to the Pellet Capture Net area and take a look at the water in the sump near the pellet capture net and check for the presence of floating material
- If floating material is observed by the around the pellet capture net, take a glass jar and collect split samples of the floating material. One sample will need to be sent to the lab for plastic determination according to Section 8 of this SOP. The other sample will need to be sent to Formosa
- Verify that the level of water in the pellet capture net area is right at or slightly below the concrete stoppers, but there should always be water in the sump (the sump should never be dry).
- From the grated area on the first floor of the WSM document the following:
  - That both maintenance valves above the 30" line are open which is observed by the valve showing no threads (Figure 7). Take a picture.

Commented [AJ2]: Added collection of water from sump area. Version 10 . This portion of the SOP has not yet been approved

Commented [AJ3]: This section has not yet been approved

Commented [AJ4]: I added this in this section since we did comment on this before but we have missed adding it. I came around it as I was reviewing in the Inspection Form. I think this should be the right place to add it.

FIGURE 7– MAINTENANCE VALVES OPEN (NO THREAD)

- That both by-pass valves located underground are closed (showing threads to the full extent) (Figure 8). Note that observations are to be made from above ground. No confined space entry is allowed. Take picture.

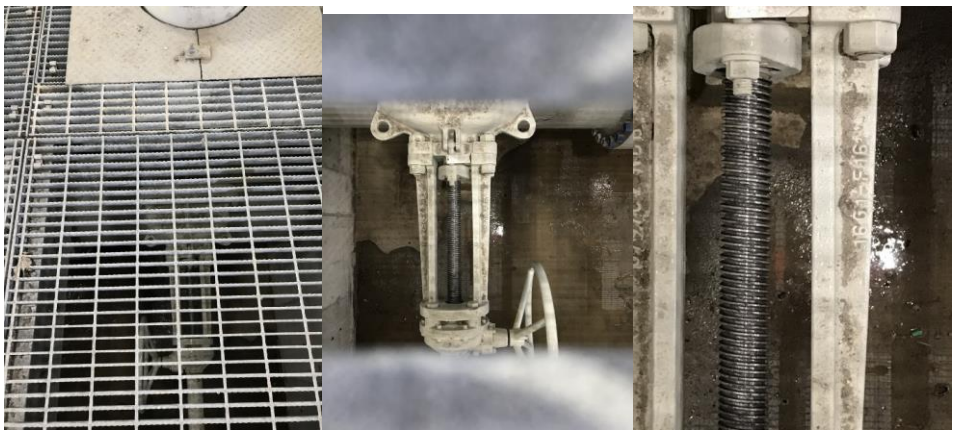


FIGURE 8–BYPASS VALVES CLOSED (COMPLETELY THREADED)

1.3.2 TSS Probe Calibration, Maintenance and Recordkeeping

- Go to the second floor of the WSM. Load the HMI in your phone application and record the TSS reading from the HMI reading (Figure 9).

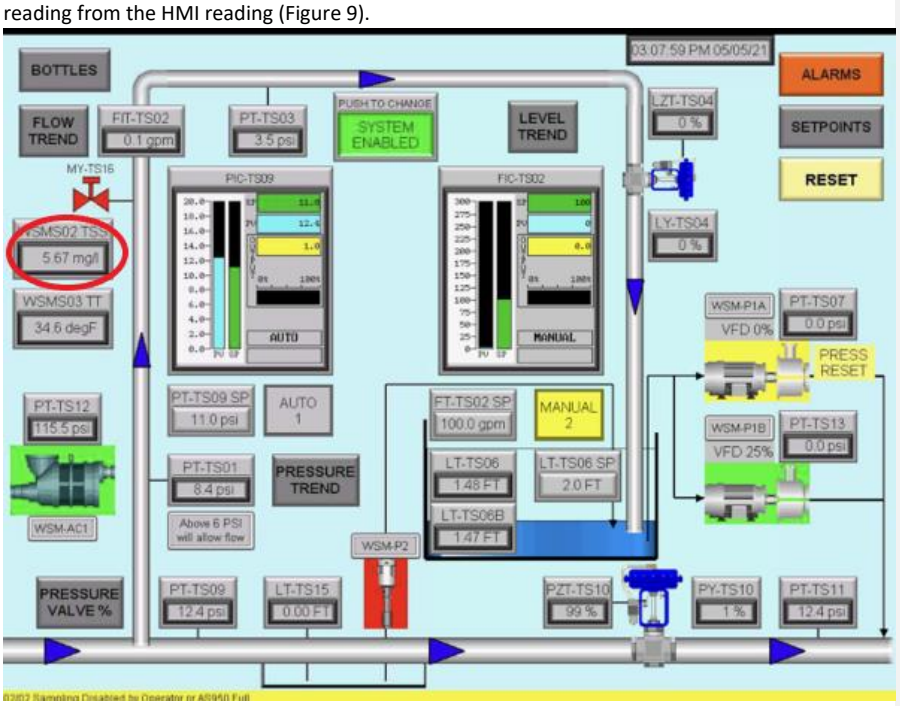


FIGURE 9 – RECORD TSS READING FROM HMI IN PHONE APP

- Go to the SC200 controller and verify the Serial Number of the online TSS Probe (the one that is mounted and connected to the 4" line). Using the "up" arrow on the SC200 select the serial number to ensure that the display for the correct TSS probe (the one online) is being displayed. Record the TSS reading for the online probe in the Inspection Form. (Figure 10). Note: the TSS readings shown in the HMI and the SC200 should be the same.

FIGURE 10– RECORD TSS READING FROM SC200 (ENSURE READING IS FROM THE ONLINE TSS PROBE)

- **TSS Calibration** - Calibration must be conducted at least once a month and every time there is indication of the equipment needing calibration (e.g., noting variation by observation and not showing it in the TSS readings). This may be adjusted based on historic data once available. Calibration will be conducted on the "spare" TSS Probe, while the "online" TSS Probe remains in use. Calibration will be done in two steps:

First Step:

- Collecting two 1-L samples from the manual sample valve (**Figure 11**). To do so, let water run for about 10 seconds prior to collecting sample. These samples will be used to calibrate the "spare" TSS Probe. As later explained in this protocol, such collected samples will then be sent to the lab for analysis to calibrate the TSS Probe (under point 11).

FIGURE 11 – MANUAL SAMPLE VALVE

- Prepare TSS standards. This will include a blank using deionized sample, a 1:2 diluted sample prepared from the collected sample, and an undiluted sample.
- Run Calibration Routine
  1. Go to SC200 controller
  2. Press **Menu**
  3. Select "SENSOR SETUP". Press **enter**. (**Figure 12**)
  4. Select "spare" TSS probe S/N". Press **enter**. (**Figure 13**)

FIGURE 12 – SELECTING "SENSOR SETUP" IN SC200

FIGURE 13 – SELECTING "SPARE" TSS PROBE

5. Select "CALIBRATE". Press **enter**. (**Figure 14**)
6. Select "CALIBRATE". Press **enter**. (**Figure 15**)

FIGURE 14 – SELECTING "SENSOR SETUP" IN SC200

FIGURE 15 – SELECTING "SPARE" TSS PROBE

7. Select "MEMORY". Press **enter**. (**Figure 16**)
8. Place "spare" TSS probe in deionized sample.
9. Select "POINT1" (**Figure 17**). Press **enter**. Once the calibration point has been recorded by the probe, a mark "<<" is shown after the point or points that has/have been recorded until processing is finished. (**Figures 18 and 19**)
10. Clean the probe

FIGURE 16 – SELECTING "MEMORY" IN SC200

FIGURE 17 – SELECTING "POINT 1" IN SC200

FIGURE 18 – WAITING FOR PROCESSING IN SC200

FIGURE 19 – WAITING FOR PROCESSING IN SC200

11. Repeat step 7, 8, 9 and 10 to record "POINT2" for 1:2 diluted sample (**Figure 20**)
12. Repeat step 7, 8, 9 and 10 to record "POINT 3" for undiluted sample
13. Send 1:2 and undiluted samples to the lab. **Do not enter a concentration value for the TSS reading at this time.**
14. Press back until home screen (**Figure 10**)
15. Clean and store the spare TSS probe and the stirrer

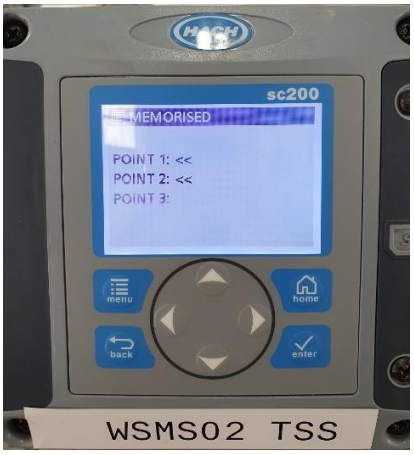


FIGURE 20 – SELECTING "POINT 2" IN SC200

IMPORTANT NOTES:

Note: If the Calibrate menu is closed and then opened again before the calibration is complete, the "<<" mark is shown again. This indicates that the calibration for this point/these points has not yet been completed. The old calibration values are still being used.

- *Point 1 is always assigned to the smallest calibration value.*
- *Point 2 is assigned to the next smallest calibration value.*
- *Point 3 is assigned to the largest calibration value.*

The value calculated in the laboratory can be corrected at any time by overwriting it.

Second Step (after obtaining results from the lab):

- Input results from the lab into calibration for the "spare" TSS Probe
  1. Go to SC200 controller
  2. Press **Menu**
  3. Select "SENSOR SETUP". Press **enter**. (**Figure 21**)
  4. Select "spare" TSS probe S/N". Press **enter**. (**Figure 22**)

FIGURE 21 –SELECTING "SENSOR SETUP" IN SC200

FIGURE 22 – SELECTING "SPARE" TSS PROBE IN SC200

5. Select "CALIBRATE". Press **enter**. (**Figure 23**)
6. Select "CALIBRATE". Press **enter**. (**Figure 24**)

FIGURE 23 –SELECTING "CALIBRATE" IN SC200

FIGURE 24 – SELECTING "CALIBRATE" IN SC200

7. Select "POINT1"(deionized sample). Enter + 0.001 mg/l TS. Press **enter**. Press **back**. (**Figure 25**)
8. Select "POINT2" (1:2 dilution sample). Enter the lab result for 1:2 diluted sample. Press **enter**. Press **back**. (**Figure 26**)
9. Select "POINT3"(undiluted sample). Enter the lab result for undiluted sample. Press **enter**. Press **back**. (**Figure 27**)

FIGURE 25 –ENTERING CALIBRATION POINT 1 (LOWEST)

FIGURE 26 – ENTERING CALIBRATION POINT 2 (MID)

FIGURE 27 – ENTERING CALIBRATION POINT 1 (HIGHEST)

10. Next step is to place the newly calibrated probe online. To do so, first close the manual valve on the first floor (**Figure 28**)
11. Open the manual sample tap to drain the 4" line (**Figure 29**)
12. After draining the water, close the drain valve

FIGURE 28 – MANUAL VALVE ON FIRST FLOOR

FIGURE 29 – MANUAL TAP DRAIN

13. After closing the valve, remove the current "online" TSS probe from mounting device (**Figure 30**)
14. Replace with the newly calibrated TSS probe

FIGURE 30 – TSS MOUNTING DEVICE

Since the previous TSS probe is replaced by the new calibrated TSS probe, you need to tell the SC200 controller to get the TSS reading from new calibrated and newly mounted TSS probe.
Below is the procedure to have SC200 controller to get reading from the new calibrated TSS probe.

14. Go to SC200 controller
15. Press **Menu**
16. Select “sc200 SETUP”. Press **enter**. (**Figure 31**)
17. Select “OUTPUT SETUP”. Press **enter**. (**Figure 32**)

FIGURE 31–SELECTING SC200 SETUP

FIGURE 32– SELECTING OUTPUT SETUP

18. Select "OUT2". Press **enter**. (**Figure 33**)
19. Select "SELECT SOURCE". Press **enter**. (**Figure 34**)

FIGURE 33–SELECTING OUT2

FIGURE 34– SELECTING SOURCE

20. Select newly calibrated probe S/N. Press **enter**. (**Figure 35**)

FIGURE 35– SELECTING "SPARE" PROBE S/N

21. Press "back". Select "SELECT RANGE". Press **enter**. (**Figure 36**)

FIGURE 36– SELECTING "SELECT RANGE"

22. Select "SOLID mg/l". Press **enter**. (**Figure 37**)

FIGURE 37– SELECTING "SOLID MG/L"

23. Press "back". Select "ACTIVATION". Press **enter**. (**Figure 38**)

FIGURE 38– SELECTING "ACTIVATION"

24. Select “SET LOW VALUE”. Press **enter**. (Figure 39)

FIGURE 39– SELECTING “SET LOW VALUE”

25. Set Low Value to “+ 0 0 0 0 0.0 mg/l. Press **enter**. (**Figure 40**)

FIGURE 40– INPUT LOW VALUE TO 0000.0 MG/L

26. Press “back”. Select “SET HIGH VALUE”. Press **enter**. (**Figure 41**)

FIGURE 41– SELECTING “SET HIGH VALUE”

27. Set High Value to “+ 0 0 5 0 0.0 mg/l. Press **enter**. (Figure 42)

FIGURE 42– INPUT HIGH VALUE TO 500 MG/L

28. Press “back” until see Home Screen (**Figure 10**).
29. Press “ ^ ”, “ ˅ ” to display the activated probe S/N reading.
30. Check the reading to see if it matches to the WSMS02 TSS reading in app.
31. Fully open the 4” Manual Valve

All lab results must be saved either electronically or on paper and available to Formosa and Waterkeeper upon request. Calibration records, which include information related to adjustments made, probe reading prior to and after adjustment, Chain of Custody records for lab and any other relevant data, must be kept by GEAR in a calibration logbook and should be available upon request by any of the parties.

Wiping/cleaning and proper storage of the “spare” TSS probe must be exercised every time a newly calibrated probe is set in operations.

1.3.3 Monitoring of Sight Glass

Monitoring and recording of the sight glass for observation of bubbles and Plastics (powders, pellets, flakes, etc.).

1. From the Overview window in the HMI, c~~C~~heck the FIT- TS02 for flow in the 4” column to verify that is within 10% the target flow of 60 gpm (54-66 gpm). If not within the range, wait for 10 min. If not within the range after 10 min, note the flow rate in the Inspection Form.
2. Check and note presence/absence of bubbles in the sight glass. Only very small bubbles[5] and in moderate quantities should be present in the system (**Figures 43 and 44**). If presence of large bubbles is encountered on more than two site visits, communicate to Waterkeeper and Formosa.
3. Check and note for the visual presence of solids in the sight glass. (**Figures 45 and 46** have examples of unusual high presence of solids in sight glass). If an unusual high presence of **solids** is observed, a manual sample should be collected to determine whether it needs to be sent to the lab for analysis. The manual sample should only be sent to the lab **if solids float** on the surface.
4. Take an approximate 30-second video of the sight glass, note date and time.
5. Note in Inspection Form whether there is accumulation of material (e.g., film, bacterial growth, etc.). Clean sight glass until film material, bacterial growth, etc. is removed.

Commented [AJ5]: I added this for clarity

Commented [AJ6]: At this point there is no reference of taking a manual sample from the valve as there is no agreement on that, but notes should be made of high presence of “solids”…note that we are not saying Plastics

John – note in page 3 point 3 of this manual in the definition of the wsm, taking a manual sample from the manual valve has all along been part of the design purpose of the wsm. This is by no means new. Hopefully we can come up with an agreement on a protocol and this is acceptable as this has been part of the design of the WSM all along

[5] GEAR will be provided with a video indicating acceptable bubble conditions in the sight glass.

FIGURE 43– UNACCEPTABLE PRESENCE F BUBBLES IN SIGHT GLASS WOULD INTERFERE WITH TSS READINGS

FIGURE 44– ACCEPTABLE PRESENCE OF BUBBLES IN SIGHT GLASS WOULD NOT INTERFERE WITH TSS READINGS

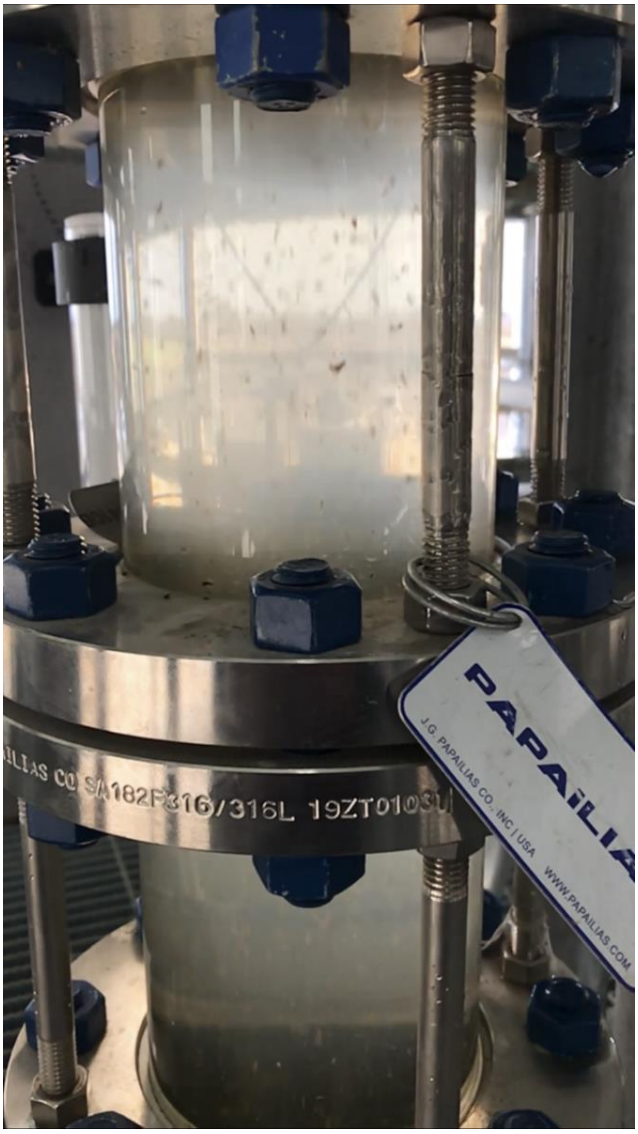


FIGURE 45 - UNACCEPTABLE PRESENCE OF SOLIDS IN SIGHT GLASS, TRIGGERING A MANUAL SAMPLE

FIGURE 46 - UNACCEPTABLE PRESENCE OF SOLIDS IN SIGHT GLASS (CLOSE UP VIEW), TRIGGERING A MANUAL SAMPLE

1.3.4 Collection and recordation of samples and replacement of automatic sampler with clean vials.

1. Go to the HMI. Push "System Enable" button to disable the 4" line (**Figure 47**)

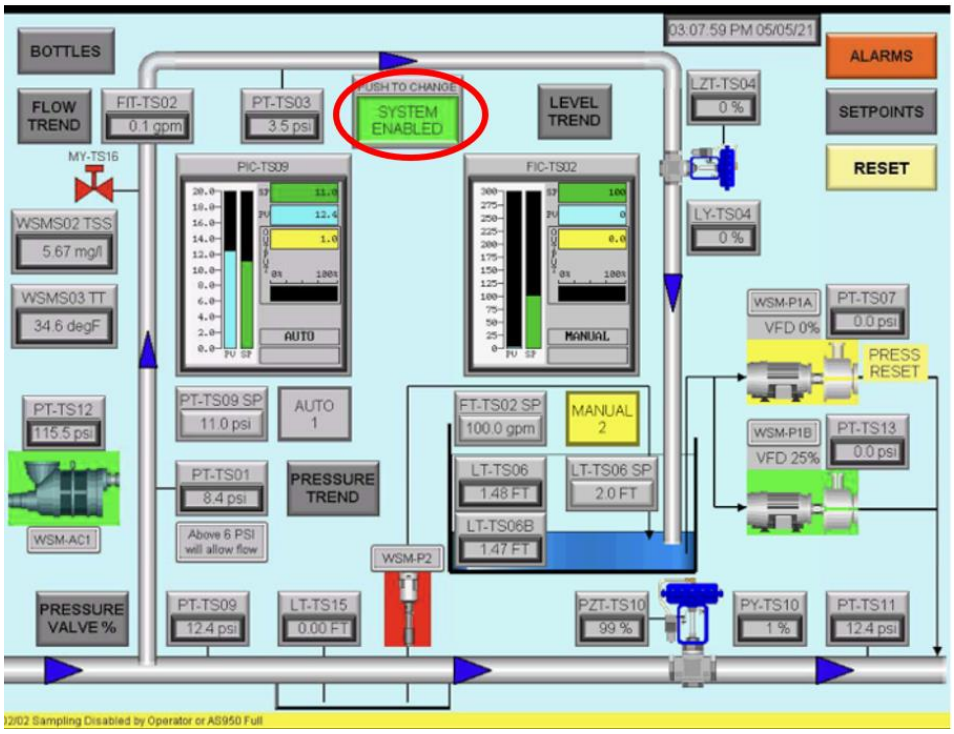


FIGURE 47 – IN HMI DISABLE 4" LINE BY PRESSING "SYSTEM ENABLED" BUTTON IN OVERVIEW WINDOW

2. Press the "Bottles" button
3. Take a screenshot of the Bottles page on the HMI

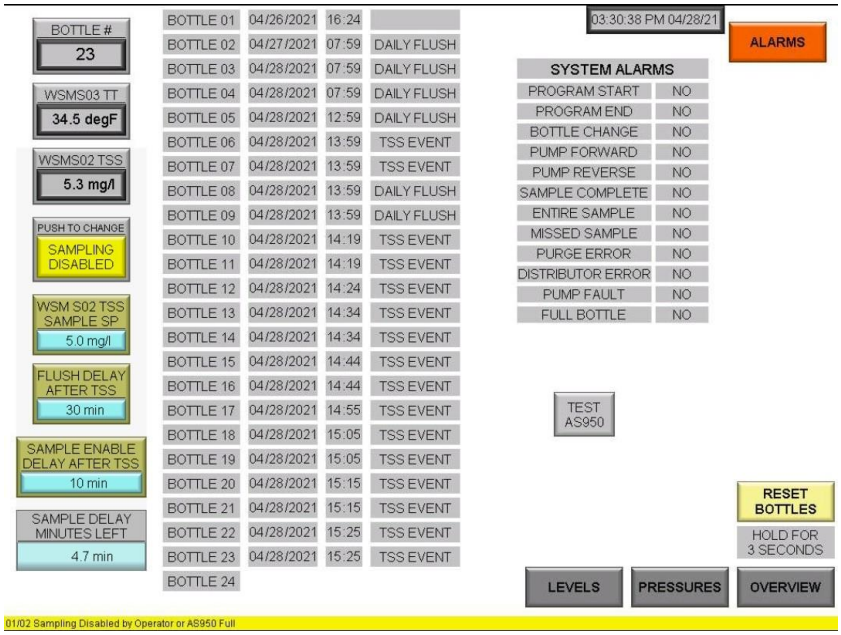


FIGURE 48 – SCREEN SHOT OF THE BOTTLES PAGE IN THE HMI

4. Go to the AS950 Controller in the Automatic Sampler and press the "Menu" button. Please, note that the AS950 is not a "touch screen" and you need to use the "Select" button.
5. Select "Review Data" (**Figure 49**)

FIGURE 49 – SELECT "REVIEW DATA" IN AS950 CONTROLLER

6. Select “Sample History” (**Figure 50**)

FIGURE 50 – SELECT “SAMPLE HISTORY” IN AS950 CONTROLLER

7. Select “All Samples” (**Figure 51**)

FIGURE 51 – SELECT “ALL SAMPLES” IN AS950 CONTROLLER

8. Take a photo of the Bottle Log (all pages) (**Figure 52**)

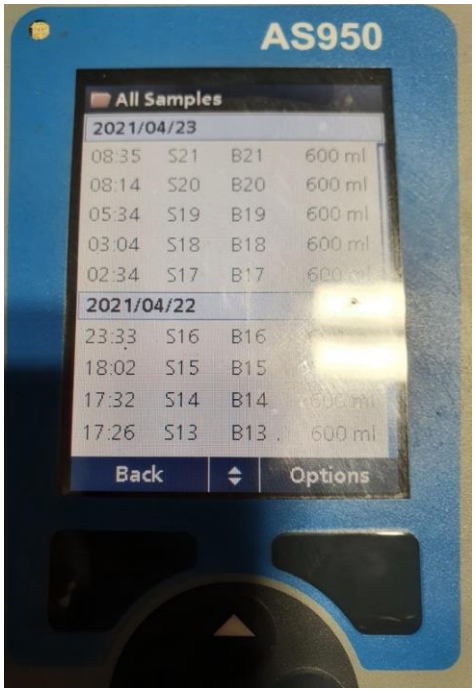


FIGURE 52 –PHOTO OF THE BOTTLE LOG (MAKE SURE YOU TAKE PHOTO OF ALL PAGES)

9. Label clean glass jars vials for sample collection
10. Open the Bottle Cabinet and collect each sample into a vial and inspect for determination of Plastics. In the Inspection Form note all bottles that appear to have floating solids. ~~Produce a composite sample from those bottles that appear to have floating solids, splitting it into two, and sending one sample to the lab and the other one to Formosa.~~ Composite samples may be produced from the samples collected from the Autosampler, but only from those samples collected within the same date. Samples collected from different dates by the autosampler need to be kept separated from each other as they would represent distinct and separate events. GEAR will produce split samples from each collected sample by separating each into two, and sending one sample to the lab, and the other one to Formosa.
11. Determining presence of Plastics in the samples[6], and reporting all samples collected from the automatic sampler will be according to the procedures described in Section 8.0.
12. Filling out Inspection Form (**Appendix**)
13. GEAR will be responsible for replenishing and resetting the system, including making sure Bottle #1 lines up with the mark of #1 on the tray and on the AS950 cabinet; then placing the rest of the bottles clockwise in ascending order (**Figure 53**). There are two sets of

Commented [AJ7]: Added for clarification that they need to be glass

Commented [AJ8]: This has not been agreed upon by either party

Commented [AJ9]: JOHN – Per conversations with Amy I had to change this as each date does represent a separate event. Please review and let me know your comments. REVISION 10

Commented [AJ10]: Until those procedures are agreed upon, only visual determination of pellets will be made from any of the areas of the WSM.

[6] Refer to Section 8.0 "*Determination of Presence of Plastic in Samples and Management of Positive Plastic Detects*", for more details.

bottles so one can be set in place while the other is taken to be cleaned. Replenish the Autosampler with clean bottles in the correct position as indicated in Figure 53. Document by taking a photo.

Commented [AJ11]: I added this for clarity

FIGURE 53 – REPLENISHING OF CLEAN VIALS IN AUTOSAMPLER ENSURING THAT BOTTLE 1 LINES UP WITH POSITION 1

~~13.~~14. Go to the AS950 Controller and press the Run|Halt button and select "End Program" (**Figure 54**)

FIGURE 54 – PRESSING RUN|HALT BUTON IN AS950 CONTROLLER

~~14.~~15. Press Run|Halt button again and select Start Program (**Figure 55**)

FIGURE 55 – PRESSING RUN|HALT BUTTON AGAIN AND START PROGRAM IN AS950 CONTROLLER

~~15.~~16. Hear autosampler start. Check that the autosampler arm is at the #1 position.

1.3.5 *Cleaning of Pellet Capture Net, Triggering of Sample Collection from Powder Bay Collection Area, and Cleaning of Net and Powder Bay*

1. Remove pellet capture net and inspect and collect Plastics, if applicable (**Figure 56**)
2. Remove the finer capture net from 4" pipe insert and inspect. If plastics are suspected, cut it in a long half, put each half into a glass jar and send one to the lab and the other to Formosa (**Figure 57**). Replace finer capture net with new net.

FIGURE 56 – REMOVE PELLET CAPTURE NET FIGURE 57 – REMOVE FINER CAPTURE NET

3. Inspect for Plastics contained within marked redlined areas within the sump. These areas are marked in the sump and may be subject to change based on GEAR recommendations through future observations. Figure~~s~~ 58~~.1 and 58.2~~ show ~~some~~ an example~~s~~ of powder within sump area. Figures 59.1 and 59.2 show the marked redlines to be inspected within the sump.

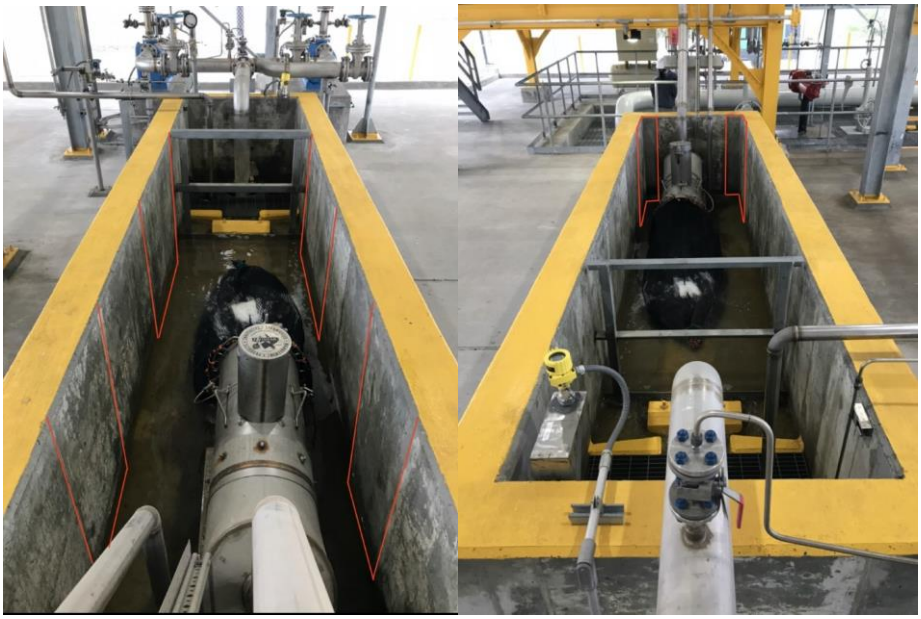
Commented [AJ12]: This is in preparation for the pipe insert once it is installed and once the mesh size is agreed upon. This won't be done until it is agreed upon.

Commented [AJ13]: Insert – it is a placeholder for a picture of the actual install and mesh once it is done. Not to be done until agreed upon

Commented [AJ14]: This won't be done until agreed upon

FIGURE 58~~.1~~ – INSPECT FOR PLASTIC IN CONCRETE IN POWDER BAY

Commented [AJ15]: Eliminated this picture as this area is not where we want to inspect for plastics as it is in the sump area



FIGURES 59.1 AND 59.2 – REDLINE MARKS TO BE INSPECTED FOR POWDER WITHIN SUMP AREA

4. If any Plastics are found, document the findings with photographs/video. The event and samples will be recorded in the inspection Form.
5. In the event of finding pellets, GEAR will obtain photographic documentation prior to and after collection, collecting all the pellets from the bay area and documenting it in the Inspection Form (Appendix). GEAR will send collected pellets to Formosa. Once GEAR visually identifies Pellets, it will automatically constitute a positive plastic identification.
6. If powder or flakes are detected, photographic documentation will be obtained of the Plastic observed prior to collection and once the material is collected in the vials. The event and samples will be recorded in the Inspection Form (Appendix). However, once GEAR preliminary identifies either powders or flakes, this will need to be confirmed by lab analysis. Analysis needs to be conducted as indicated in Section 8.0 indefinitely unless requested in writing and agreed to by all parties.
7. Go by to the grated area on the first floor and, for purposes of removing water from the sump area, turn the WSM-P2 pump controller to the "Hand" mode (Figure 59.3) and wait until the water in the sump in the pellet capture until there is no water coming out of the pipe from the sump (Figure 59.4). Go back to the WSM-P2 controller and turn to "Auto" mode.

Commented [AJ16]: Wont be done until agreed upon

FIGURE 59.3 AND 59.4 - WSM-P2 PUMP CONTROLLER AND PIPE DISCHARGING TO THE PELLET CAPTURE NET AREA

8. Thorough cleaning of nets and sump are required prior to returning the WSM back to service. Cleaning will occur by pressure washing all areas of the sump, including washing all pipes and surfaces and photo documenting after washing is completed. Thorough cleaning will be accomplished by utilizing the pressure washer and vacuuming after the washing has been completed. The net needs to be pressure washed by bringing it inside out several times until it is completely clean and both inside and outside cleanings need to be photographically documented. The finer net in the smaller pipe needs to be replaced every time it is inspected, and the pipe thoroughly cleaned through pressure washing and photographic documentation must be also maintained.

9. After cleaning and re-attaching the clean net, go to HMI Overview page and press the "System Disabled" button to enable the system. (Figure 60)

Commented [AJ17]: Added use of vacuum cleaner in the sump. Version 10. .

Commented [AJ18]: Hasn't been agreed upon. We just discussed it but we didn't developed this as a group.

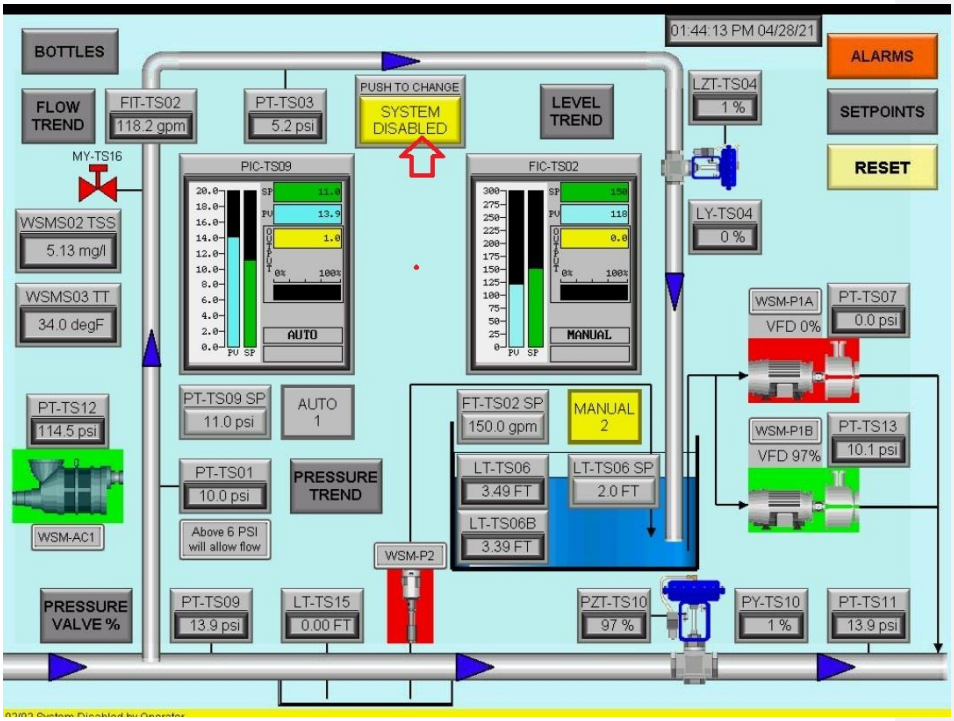


FIGURE 60 – IN HMI PRESS SYSTEM DISABLED TO ENABLE THE SYSTEM BACK

10. Press “Manual 2” button to get the system back into Automatic mode “Auto” (**Figure 61**)

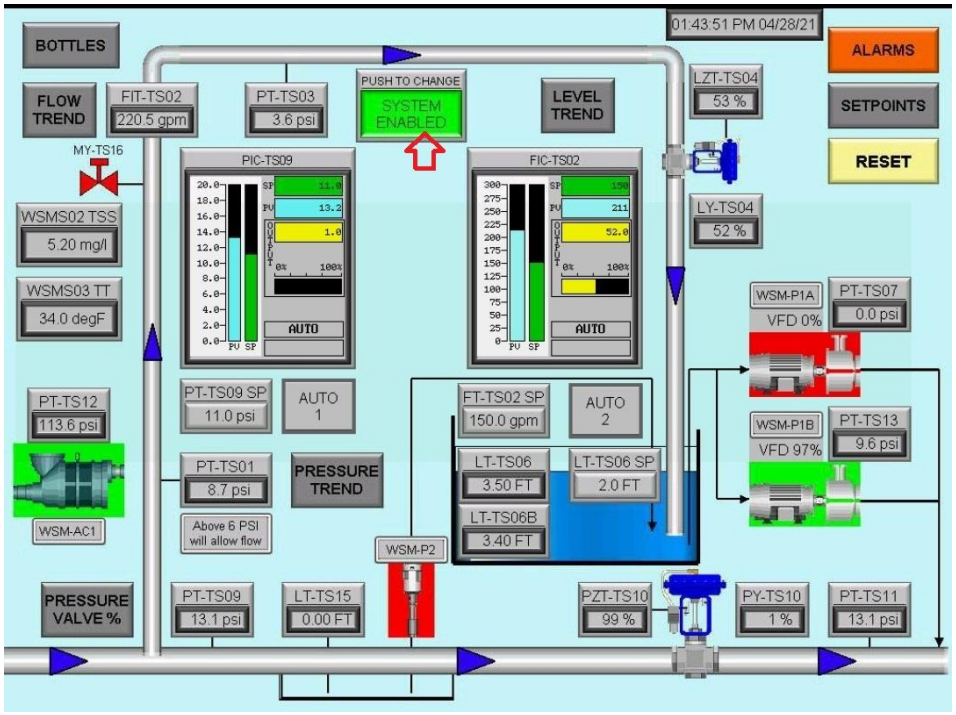


FIGURE 60 – IN HMI PRESS "MANUAL 2" BUTTON TO BRING SYSTEM BACK TO "AUTO"

11. Select the "Bottles" button

12. Press and hold the "Reset Bottles" for 3 seconds until bottle log is deleted. Press "Sampling Disabled" to enable auto sampling (**Figures 61 and 62**)

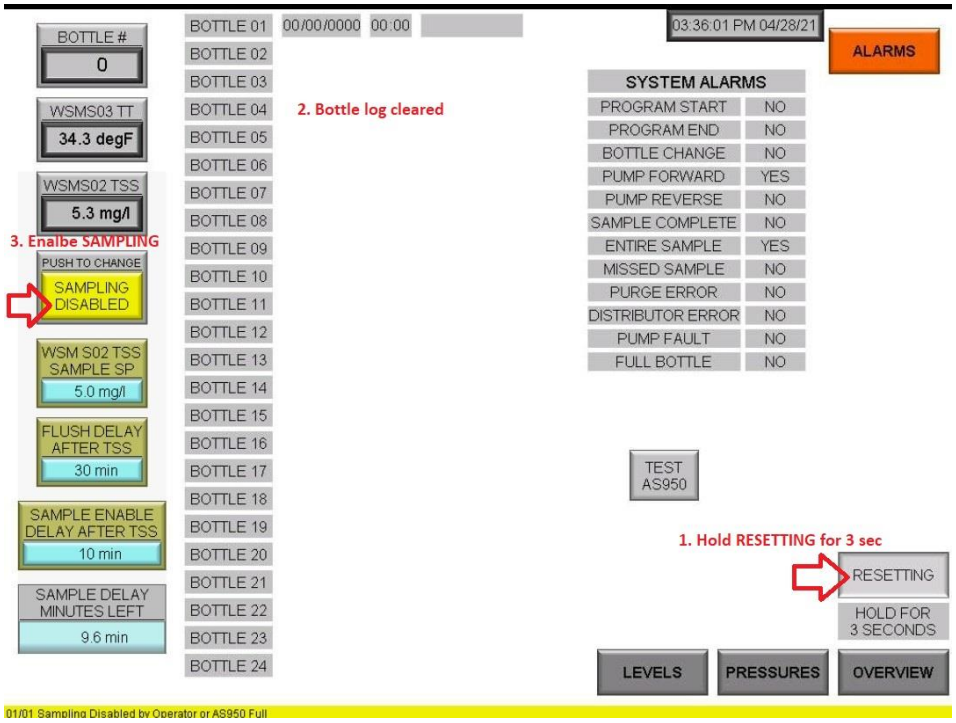


FIGURE 61 – IN HMI "BOTTLES" PAGE, "RESET BOTTLES" TO DELETE DATA LOG, AND PRESS "SYSTEM DISABLED" TO ENABLE AUTOSAMPLER BACK.

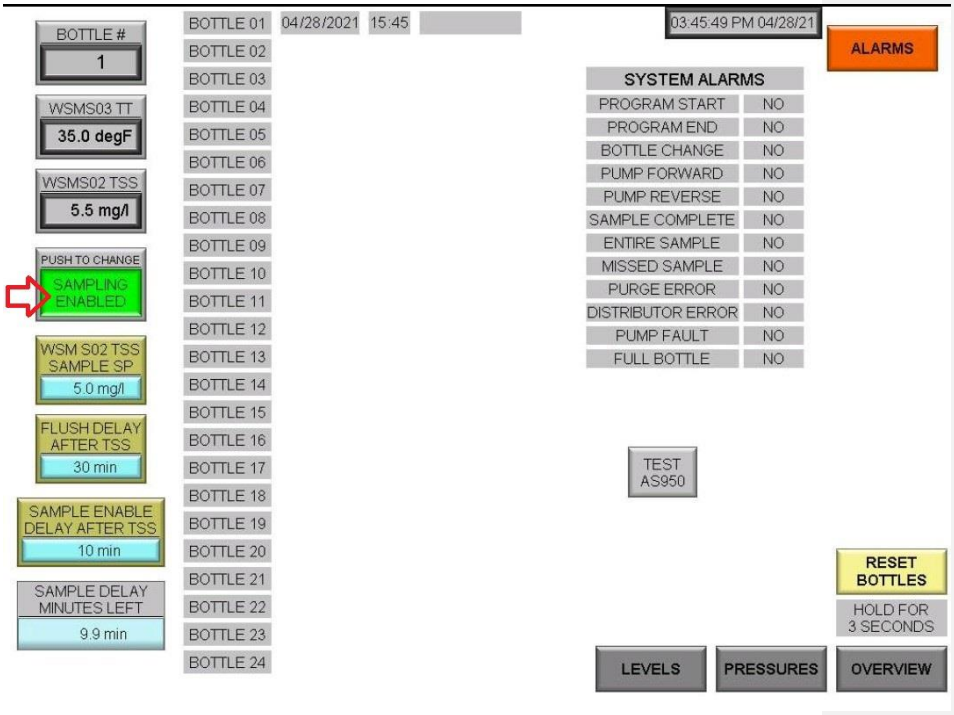


FIGURE 62 – THIS IS THE REP-SET HMI "BOTTLES" PAGE. READY TO START A NEW CYCLE

13. Go back to the Overview page and wait for 10 minutes to then check for the following:
   i. Flow is within ±10% gpm target flow (FIT SO2 SP and FIT TSSO2)
   ii. Level in sump LT- TS06< = 2.2 ft

   If after 30 minutes these targets ranges are not within range, Formosa and Waterkeeper need to be notified.

1.3 Communication, Notifications and Reporting Requirements

1.3.1 Routine Communication

GEAR, Formosa and Waterkeeper will be notified of a TSS trigger event. GEAR will respond to the triggering event by having a Designated Personnel member collect the sample at the WSM

no later than 48-hours following the trigger event. GEAR is responsible for completing the responsibilities assigned under 1.2 utilizing the Inspection Form in the **Appendix**.

GEAR will provide weekly reports consisting of filled out Inspection Forms, photographic documentation, as well as records determining any Plastics present[7] from samples obtained from: manual valves, pellet capture net, sediment bay and automatic sampler. Copies of the reports shall be submitted weekly in electronic format via email to Formosa and Waterkeeper. Copies should be distributed to John Hyak, Matt Brogger, John Riley, Dr. Aiza Jose Sanchez, Diane Wilson, Bob Lindsey, Amy Johnson, and Jennifer Richards.

Any **technical routine communication** and questions related to the WSM or any monitoring activity from GEAR should be done by email to both Formosa and Waterkeeper representatives (John Hyak and Aiza Jose Sanchez). John Hyak will typically direct the question to whomever may be able to respond copying any appropriate party to resolve the concern inclusive of Waterkeeper's representative.

1.3.2 Maintenance or Emergency Communication

GEAR should immediately notify via email and via phone Aiza Jose Sanchez and John Hyak of any of the following:

- malfunctioning of the equipment
- inability of conducting any of GEAR's responsibilities
- non-medical, non-safety emergency situations at the WSM

Any life threatening emergencies should immediately be notified to 911 with a follow up notification to Formosa by calling 361-987-2111.

1.3.3 Remote Human Machine Interface (HMI) – Real Time Data

An app has been developed which will provide monitoring of real time operations data for the WSM[8]. This app is available to GEAR, Formosa and Waterkeeper. **Figure 2** presents an example of HMI display and the information provided by the app.

1.3.4 Live Video Feed

The WSM is equipped with five cameras to monitor the different areas of the facility. Live feed is available for GEAR, Formosa and Waterkeeper.

[7] Refer to Section 8.0 "*Determination of Presence of Plastic in Samples and Management of Positive Plastic Detects*", for more details.
[8] Note: the app only allows users to view and not to modify or alter operations of the WSM

1.3.5 Historic Communication and Information

A File Transfer Protocol (FTP) system has been set up to be able to connect to the historic database remotely with a downloadable application. This information will be useful to further refine the monitoring system and help streamline its operation. Access to this system will be given to selected team members including the following:

- GEAR
  - Anton Kindzrsky anton.kindzirsky@gmail.com
  - Matthew Wateford
  - Jaden Finch
  - Jessica Palitz
  - William Wolfe
- Formosa
  - Authorized Formosa Personnel.
- Waterkeeper
  - Dr. Aiza Jose Sanchez and she will distribute to the Waterkeeper and Amy Johnson.

Commented [AJ19]: Added GEAR names

2.0 Recording of General Information During Inspections

All the information covered under this section should be recorded in a new Inspection Form every time GEAR is at the WSM. This includes any time GEAR is at WSM either because there is a qualifying TSS event or because it is a routine twice-a-week inspection event.

2.1 Identify Inspector

Under this section, GEAR personnel conducting the inspection should be identified by name. Additionally, the date and time of inspection should be recorded.

2.2 Inspect and Report Site's Security Mechanisms

Report: working condition, appearance, access, etc., to all the different security mechanisms of the WSM including E-lock verification, review of camera recordings, fencing intact, any other items. Note any unusual activity or indication in any of the systems. Gate status (locked, unlocked, breached, etc.) Any other comments from a review of camera recordings

2.3 Describe Weather Conditions and Date and Amount since Last Rainfall

GEAR to document weather condition on the date of inspection.

3.0 Recording of Human Machine Interface (HMI) Indicators during Inspections

All the information covered under this section should be recorded in a new Inspection Form every time GEAR is at the WSM. This includes any time GEAR is at the WSM either because there is a qualifying TSS event or because it is a routine twice-a-week inspection event.

3.1 Recording of Pressure Transmitter in 30" line (PT- TS09)

The pressure in the 30" line coming from the CTWP is a variable that is not controlled at the WSM; however, the throttle valve is adjusted to ensure that a target pressure is maintained in the portion of the 30" line immediately feeding the WSM. This is what we refer to as the sampling portion of the pipe. By keeping the pressure at a given range, we then assume that the pipeline in the sampling portion of the pipe is kept approximately 80-100% full. Records will be kept on the pressure variations as we better understand the variation of this parameter so that the system is kept under control. Indications of the 30" line flowing full at the sampling portion would be a low presence of bubbles in the WSM as indicated in the sight glass. The opposite would mean that the pipe is likely flowing empty and adjustments need to be made to the throttle valve.

3.2 Recording of Pressure Transmitter on 4" line (PT-TS03)

This is an indicator to ensure the 4" line is flowing full of water all the time. The transmitter indicates the pressure at the horizontal section of the 4" pipe. The value measured here does not affect the control logic but is an indicator of instrument functionality and how equilibrated the system is. Pressure readings at PT-TS03 should always be positive.

3.3 Recording of Percentage of Throttle Valve Opening (PZT-TS10)

PZT-TS10 shows the opening percentage of 30" throttle valve PCV-TS10. Note, 100% is fully opened. The percentage opened is automatically changed to adjust the pressure as needed. This will be adjusted by means of an actuator that monitors pressure in the 30" line (PT-TS09).

3.4 Recording of flow in 4" line (FT-TS02)

This is an indicator to control the 4" line in a limited flow rate. The 4" Throttle valve (LCV-TS04) will respond to the reading and keep the flow rate within ± 20 gpm a given flowrate (also in gpm).

3.5 Programmed Pressure at Influent from 30" line (PT-TS01 SP)

Although this is a target value for which the WSM will be calibrated so that the 30" line is flowing full in the sampling portion of the pipeline and it is a value that won't need to be adjusted by the Monitor, it is a parameter that needs to be tracked through time in case the system presents variations. Currently, it appears that the target value for this parameter is between 11 and 15 psi.

3.6 Recording of Percentage of Throttle Valve Opening (LZT-TS04)

LZT-TS04 is the opening percentage of 4" throttle valve LCV-TS04. Note, that 100% is fully open.

3.7 Recording of TSS Reading (WSM-S02_TSS)

Reading of the TSS will be shown/recorded on the HMI as well as in the SC200 Controller. Refer to section 1.2 The reading range is 0 to 500 ppm or mg/L. The Auto-Sampler will be triggered and collect a sample if the reading exceeds 40 ppm or mg/L (at least preliminarily. This threshold may change over time).

3.8 Recording of pressure at the inflow line to automatic sampler

This is a local pressure gauge indicating the pressure of Auto Sampler feeding line. The pressure measured here does not affect any control logic.

3.9 Recording of Temperature in Automatic Sampler Cabinet (WSM-S03_TT)

Indicate the temperature within the Auto-Sampler. This parameter does not affect the control logic.

3.10 Recording of every bottle collected from the automatic sampler

Record the number assigned to the specific bottle collecting the sample, the type of sample collected (TSS flush, TSS event or Daily flush), date and time of automatic collection, and observations for each sample (whether Plastics were observed or not in each of the samples, indicating the type of Plastics - pellets, powders or flakes) along with photographic documentation. There are 24 bottles in the sampler. We will add a tag to each bottle location. The HMI has a page that shows the bottle log (**Figure 2**).

3.11 TSS Threshold Set Point (WSM S02 TSS SAMPLE SP)

This is the threshold point that is defined to trigger a TSS sampling event. When the TSS probe detects any sample exceeding the set threshold, it will send a signal to the automatic sampler to collect a sample. The collection will be marked as a TSS event in the automatic sampler. The threshold has been currently set up at 40 ppm or mg/L. This threshold may be modified as needed.

3.12 Recording of TSS timer 1 (Flush delay after TSS)

This is a fixed number representing the time elapsed after the automatic sampler takes another sample to flush the tubing after a TSS exceedance event has occurred. In the other words, whenever there is a TSS exceedance event there will be two bottles of sample being collected; one will correspond to the regular TSS sample, and the other one will be a flush collected at a specified delay time. Note, the flush has been currently set up to occur 30 minutes after the sample event. The flush delay time may be modified as needed. The Monitor will verify that the timer is correct by recording TSS timer 1 as shown in the HMI in the Inspection Form.

3.13 Recording of TSS timer 2 (delay to take a new sample after a sample has been collected)

This is a fixed number representing the time between samples after a trigger has been activated for a TSS event and a sample has been collected and before a new trigger can be activated. The automatic sampler will not collect the second bottle within this period of time after the first sample was taken. This has been currently set to be 180 minutes. In other words, no new TSS event shall be recorded after a TSS event unless 3 hours have passed after a TSS exceedance event. The TSS timer 2 may be modified as needed. Monitor will verify that the timer is correct by recording the TSS timer 2 as shown in the HMI in the inspection form.

4.0 Inspection, Recording and Data Collection from 4" Vertical Line (Sampling Column)

All the information covered under this section should be recorded in a new Inspection Form every time GEAR is at the WSM. This includes any time GEAR is at WSM either because there is a qualifying TSS event or because it is a routine twice-a-week inspection event.

4.1 Recording of Observations in Sight Glass

Per visual inspection, observe and record whether there are pellets, flakes, powder or fines in the sight glass. Also, check for presence of bubbles in the sight glass. Document observations per Inspection Form, including date and time of observation.

4.2 Recordings of Collection of Sample from Manual Valve

A sample from the manual valve will be obtained under any of the following circumstances: (1) if there is suspicion or confirmed Plastics per visual observation in the sight glass, (2) suspicion or confirmed Plastics in the capture net, (3) suspicion or confirmed Plastics in the sediment bay, and/or (4) missed sample, no water in any of the bottles, from the automatic sampler. If a manual sample is collected, note any visible Plastics. If powders or flakes are suspected, they need to be sent to the lab and analyzed according to Section 8. Document observations. If no sample is collected, note "no sample was collected."

4.3 Recording of Collection of Sample Vials from Automatic Sampler

For each bottle for which a sample was collected, record the number of the bottle, type of sample (flush or sampling event), date and time of automatic collection, and observations (Plastic present or not, type of Plastic – pellets, powder or flakes, and document with photos). If powders or flakes are suspected, they need to be sent to the lab and analyzed according to Section 8.

5.0 Inspection, Recording, and Maintenance in the Pellet Capture Net Area

All the information covered under this section should be recorded in a new Inspection Form every time GEAR is at the WSM. This includes any time GEAR is at the WSM either because there is a qualifying TSS event or because it is a routine twice-a-week inspection event.

5.1 Recording of Observed water level @ powder bay

The Monitor will measure the level of water with respect to the top of the concrete stoppers. Water should not be overtopping the concrete stoppers.

5.2 Record the type and quantities of Plastics recovered from the capture net (Observation of quantities of Plastics recovered)

Every time the Monitor is inspecting the WSM, the net needs to be inspected for the presence of Plastics. Types and quantities of Plastics need to be recorded and documented. Whenever there are Plastics (either powder, flakes or pellets), the net needs to be removed, completely cleaned from Plastics and re-attached. If powders or flakes are suspected, they need to be sent to the lab and analyzed according to Section 8.

5.3 Recording of Observations on the reattachment of pellet capture net

Record any issues noted when reattaching the pellet capture net. Please complete documentation for the same record as 5.2 above.

5.4 Recording of Observations of Plastics on concrete walls and bay

Record any visible Plastics present on the specific locations marked inside the pellet capture net area. This could include a line of fine powder in the concrete mark of water levels, for example. Please complete documentation for the same record as 5.2 above. If powders or flakes are suspected, they need to be sent to the lab and analyzed according to Section 8.

5.5 Clean walls and bay and record in Inspection Form

If for 5.4 there were any Plastics presents in any portion of the powder bay (walls, stoppers, etc.), Cleaning will occur by pressure washing all areas of the sump, including washing all pipes and surfaces and photo documenting after washing is completed. The net needs to be pressure washed by bringing it inside out several times until it is completely clean and both inside and outside cleanings need to be photographically documented. The finer net in the smaller pipe needs to be replaced every time it is inspected and the pipe thoroughly cleaned through pressure washing and photographic documentation must be also maintained. Document with photographs once cleaning operations are completed.

6.0 Recording of Other General Operation Conditions

All the information covered under this section should be recorded in a new Inspection Form every time GEAR is at the WSM. This includes any time GEAR is at the WSM either because there is a qualifying TSS event or because it is a routine twice-a-week inspection event.

6.1 Mosquito habitat

This may be critical at the capture pellet net area and sump area. Conduct periodic visual inspection, especially during the warmer periods of the year. Make note in the Inspection Form.

6.2 Fouling of lines

This may be critical for the sampling tube feeding the automatic sampler. Conduct periodic visual inspection, especially during the warmer periods of the year. Make note in the Inspection Form.

6.3 Alarms going off

The HMI should provide indication of alarms going off. Make note in the Inspection Form.

6.4 Evidence of Flooding or Overflow

This may be critical at the capture pellet net area and sump area. Conduct periodic visual inspection for indication of flow lines and other indications of overflow. Make note in the Inspection Form.

6.5 Other inspector comments

Inspector will record information relative to the presence of Plastics in the system or in general that may help the operation of the system

7.0 Equipment needed for Inspection and Maintenance of WSM

Equipment anticipated include a basic mechanic toolbox, glass vials with caps, laboratory vials when taking samples to calibrate the TSS probe. Periodically, the Monitor will need water to clean the net and pellet capture area. Document the use of any equipment other than the one noted in this SOP.

8.0 Determination of Presence of Plastic in Samples (Pellets, Powders and Flakes) and Management of Positive Plastic Detects

Commented [AJ20]: Other than the pellets being done by visual determination only, this section is generally not agreed upon.

Plastic pellets produced at Formosa are mostly white or opaque with sizes ranging from 3 – 5 mm. The shapes can be round, disc-like and cylindrical. Additionally, pieces of broken pellets may be observed at times. Flakes and powders may be white but may also get stained. Color may not be the only indicator to determine whether there are flakes and powders in the wastewater. The type of polymers used at Formosa in the manufacture of pellets generally float in water; however, some of the polymers sink in water. Therefore, Plastics would generally float, but this may not be a definite characteristic of Plastics in water.

In the event of finding pellets, GEAR will obtain photographic documentation prior to and after collection, collecting all the pellets in split samples from the bay area and documenting it on the Inspection Form (Appendix). GEAR will send samples of pellets to Formosa. Once GEAR visually identifies Pellets, it will automatically constitute a positive plastic identification[9].

If powder or flakes are detected, photographic documentation will be obtained as observed prior to collection and once the material is collected in the vials. Split samples will be collected from both the bay area, and the manual valve. Powder/flakes collected may be either from the material seen floating or from that sticking to the concrete walls of the bay. The bay area will be cleaned after the samples are collected to ensure no powder remains anywhere inside the sump area. The event and samples will be recorded in the Inspection Form (Appendix). However, once GEAR preliminary identifies either powders or flakes, this would need to be confirmed by lab analysis. The analytical method to be utilized to confirm or refute the presence of plastics in powders and flakes is XXX-XXXX. Analysis needs to be conducted as indicated below. Analysis needs to be conducted as indicated in this section indefinitely unless requested in writing and agreed to by all parties.

Commented [AJ21]: Insert analytical method here. So far, per Anton's email we may either utilize Pace Analytical Labs and Dr. Zhanfei Liu's Lab at UTMSI. These labs would use Fourier-transform infrared spectroscopy (FTIR) or X-Ray Diffraction (XRD) methods for plastics ID analyses. I am inquiring a bit further on TAT, certification, QA/QC, etc.

Every time a preliminary visual determination for powders and flakes has been made by the Monitor from any of the potential collection areas of the WSM-automatic sampler, manual valve, capture net, powder bay), the Monitor should attempt to save enough sample to provide a total of two split samples in separate glass containers with caps. If two samples are taken, one sample will be immediately sent to a previously identified laboratory agreed upon by both Formosa and Waterkeeper. Sample collection, packaging, and delivery will be done following all industry protocols, including filling a chain of custody. The vials need to be carefully labeled with the date, time and location from which the sample was gathered for ease of **identification. Formosa split sample will not be utilized to dispute the results**

[9] Pellets positive determination of plastic will be done based on visual analysis only. If Formosa would like to do further analysis to determine specific pellet composition, it would be for different purposes than to determine a positive plastic detect in the WSM and would have to conduct it on its own terms.

obtained from the third-party lab. Final determination of Plastics' presence will be based on the flowchart provided in **Figure 4**.

Commented [AJ22]: John – this is preliminary. I misunderstood and Ms. Johnson proposed to John Riley that if the only purpose for Formosa was to get the split was to trace back the origin of the plastic and not to dispute the lab, then Waterkeeper is okay with not obtaining a split. However, John has not confirmed that Formosa is okay with this. So there is no agreement on this as of yet. This is therefore still preliminary

Photographic documentation must be provided along with the samples of pellets, powders and flakes. The photographic documentation should include: date and time, separate photographs should be taken of the plastic at the location found in the WSM and another one showing it in the sample vial. For example, while checking the pellet capture net, a picture should be taken with the pellet in the net. Likewise, a picture should be taken of the powder bay showing the powder in it.

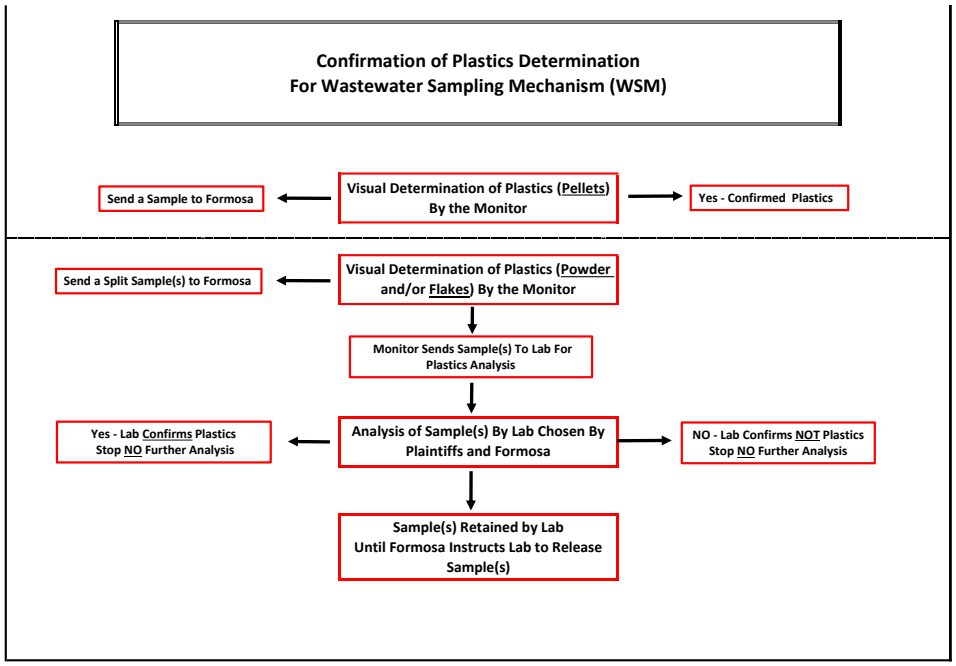


FIGURE 4 –DETERMINATION OF PLASTICS

9.0 Photographic and/or Video Documentation

Photographic documentation[10] must be obtained at every site visit. Use the Inspection Form as a guide for the type of photos that are, at a minimum, necessary, but take more photos than those shown in the form and as many necessary to document all observations. All photographic documentation must be

[10] Documentation may be done by still photographs and/or videos any time photographic documentation is mentioned.

labeled with date, time and exact location on the WSM. Also, photos of the Plastics should be obtained at the area found and also once collected in its vial.

10.0 Health and Safety Provisions

Full H&S Plan will be provided and kept by GEAR. Description of minimum personal protective equipment, job safety analysis and nearest hospital to WSM are provided below. Field personnel should promote safety and safe working conditions. No phase of operations or administration should be of greater importance than prevention of injury and illness. Safety should take precedence over expediency or shortcuts. Every reasonable step should be taken to reduce the possibility of injury, illness, or accident.

For medical emergencies call 911

For emergencies related to fires, spills or leaks call Formosa Emergency line 361-987-2111

10.1 Personal Protective Equipment

- Boots or closed-toe shoes
- Hardhat
- Coveralls or work clothing (long pants are required; however, short sleeves are acceptable)
- Work gloves (for certain activities on as needed basis)
- Hearing protection (recommended)
- Safety glasses

10.2 Job Safety Analysis

❶ Potential Hazards	❷ Critical Actions	STOP Stop Work Criteria
Slips, Trips and Falls (wet surfaces within the WSM)	• Wear PPE (adequate non slip and hard toe shoes) • Should the walking or working surfaces become wet, extra caution must be taken to avoid slipping • Use handrails when using stair ways • Use three point control for climbing ladders	• Not wearing adequate PPE
Working from heights (platforms and stairs/ladders within the WSM)	• Use handrails when using stair ways • Use three point control for climbing ladders	• Not wearing adequate PPE
Noise	• Use hearing protection	• Not wearing adequate PPE

❷ Potential Hazards	❸ Critical Actions	STOP Stop Work Criteria
Lifting/Dropping Hazards Grate sump cover, lever on pellet capture net, opening/closing valves	• Wear PPE (gloves, eye protection) • Use adequate techniques for lifting heavy objects • Follow manufacturer recommendations on maintenance of pellet capture net • Use adequate tools	• Not wearing adequate PPE • Not having adequate tools
Confined space entry (vault area) Other than Formosa's designated personnel, field personnel and visitors are not allowed to make entry into confined spaces during the execution of any task.	• Do not enter the vault without appropriate permit and without buddy system in place. GEAR should not enter the vault. If maintenance of the vault is needed, FORMOSA should be notified.	• Not being FORMOSA staff • Not having a confined space permit or the training needed • Not having a buddy system
Heat stress (summer time)	• Maintain hydrated at all times • Take adequate breaks during the inspection assignments to hydrate and cool down	• Showing signs of heat stress or heat stroke including nausea, dizziness, fainting, lack or reduced perspiration, strong rapid pulse, red, hot unusually dry skin.
Cold stress (winter time) - Hypothermia is the most serious form of cold stress and can occur with air temperatures above 16°C (60°F) under wet and/or windy conditions	• Wear proper protective clothing for low temperatures • Take adequate breaks during the inspection assignments • Maintain a healthy diet and nutrition	• Showing signs and symptoms include uncontrollable fits of shivering, incoherence, listlessness, fumbling hands, frequent stumbling, drowsiness, and the inability to get up after resting

❶ Potential Hazards	❷ Critical Actions	STOP Stop Work Criteria
Biological Hazards • Mosquitoes • Rats/Mice • Black widow spider • Brown recluse spider • Scorpion • Tick • Bees • Wasps • Fire ants • Copper heads • Cottonmouth (water moccasins) • Rattlesnake	• Wear insect repellent • Take care when reaching into small dark spaces. • If bitten by a black widow or brown recluse, seek medical attention as soon as possible. Scorpion stings may not require medical attention. • Check for ticks during and after field work. Remove with tweezers within 24 hours. Wash and disinfect the bite. • Avoid beehives and wasp nests. • If stung, scrape off the stinger with a knife or other flat object (e.g., credit card). Wash well with soap and water. A cold pack may be used to reduce swelling. Use an over-the-counter sting ointment and or solution of water baking soda. • If a member of the field team is allergic to insect bites or stings, this should be made known to the rest of team. That person should carry a sting kit for use in emergencies. Symptoms of an allergic reaction include: pain, swelling of the throat, redness or discoloration in the area of the sting, itching, hives, decreased consciousness, or difficult or noisy breathing. • Avoid disturbing mounds. Wear long pants and tuck pants legs into socks. Wipe off swarming ants quickly to prevent multiple bites. • Best defense against snakes is to avoid them. Most snakes will go the other way unless unusually agitated or disturbed.	• If bitten the person should be taken to the nearest emergency room or hospital for evaluation and/or treatment.

10.3 Nearest hospital

- **Memorial Medical Center** (8.6 miles – 15 min)

  Address: 815 N. Virginia St. Port Lavaca, TX 77979 **Phone**: 361-552-6713

- **Calhoun County Emergency Medical Services**
  Address: 705 Henry Barber Way, Port Lavaca, TX 77970 **Phone**: 361- 552- 1140

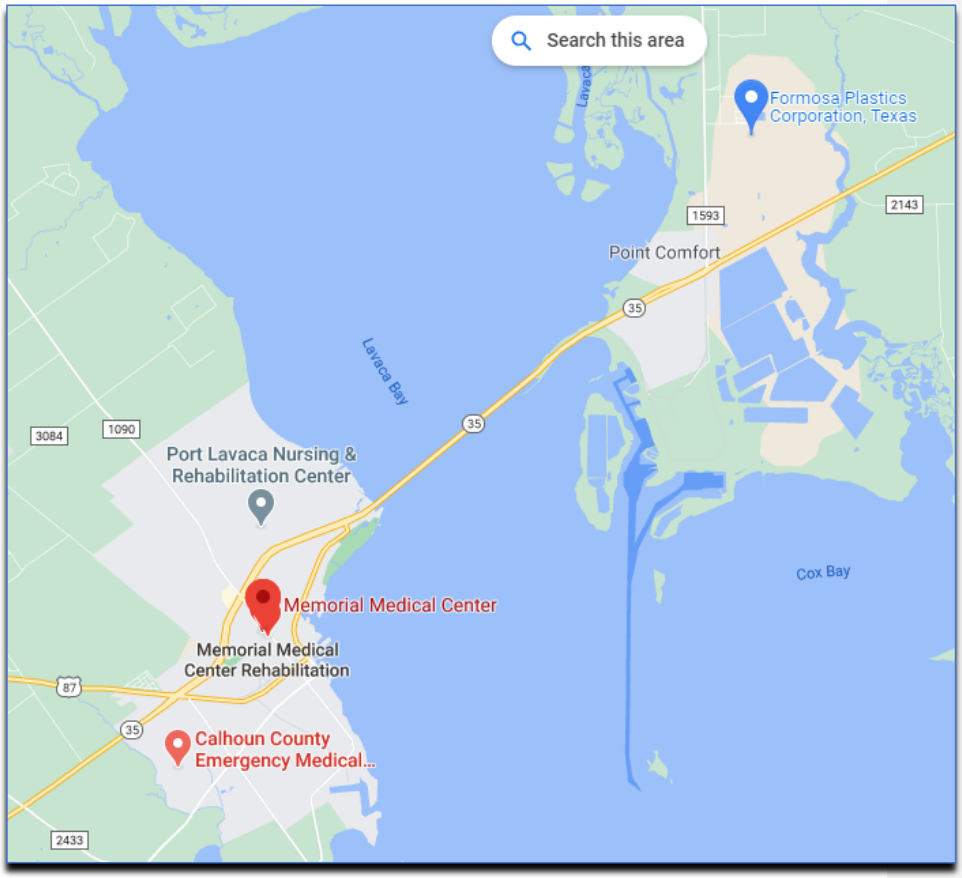


FIGURE 4 - NEAREST HOSPITAL TO WSM