XI. BASIN OPERATION EXPERIENCE

Most of the operational issues encountered during the operation of the basin have centered on the influent flow meter and Sodium Hypochlorite feed system.

A. INFLUENT FLOW METER

The influent flow meters for the basin are Accusonics Multipath flow meters. The meters are located immediately upstream of the influent pump station wet-wells. At the beginning of the evaluation program, the Sodium Hypochlorite feed was flow paced, based on the flow meter measurement.

The following problems were encountered:

1. The basin influent pumps on – off sequence affected the accuracy of the flow meter readings. This also affected the CSO volume recorded for each event.

   Operational problems with the meter made it difficult to flow pace sodium Hypochlorite.

The CSO volume estimation has been accomplished with the help of level measurements in the influent sewer and basin compartments, as well as pump run times and effluent Parshall flume measurements.

The Hypochlorite feed was changed and paced to influent pump flow, such that the Hypochlorite feed would not start until the CSO pumps start.

B. SODIUM HYPOCHLORITE FEED SYSTEM

Disinfection of all flows is considered an important part of the Phase II CSO control goal of public health protection. During the monitoring program, the fecal coliform limit was not met at all times. This section of the report presents the reasons for exceeding the limit.

1. During one of the events, the City of Inkster's CSO retention basin ran out of hypochlorite. This was due to the length of the event.

2. The strength of the sodium hypochlorite degraded over time. The degradation was due to several factors including, incorrect initial dilution, degradation during long storage (6-9 months), and volatilization of the hypochlorite during mixing by air sparging.

3. The sodium hypochlorite feed pumps malfunctioned during the evaluation program.

4. During the demonstration, there were several unsuccessful attempts to adjust the hypochlorite feed rate during a storm event in response to high measured TRC values.

Some of the lessons learned in the operation of the CSO basin result primarily from trying to solve the above problems.

- There is a need to establish the minimum storage volume of sodium hypochlorite stored at the basin. This minimum amount should be

increased in the winter (December to April). The winter events tend to last longer than events from spring/summer, increasing the chance of a back-to-back event.

- There is a need to build a sufficient database to aid in reducing Hypochlorite feed during an event. This database will help in maintaining effluent TRC concentrations at a reasonable level and achieve the required kill.
- There is a need to set up monthly testing of the stored hypochlorite, as well as testing after delivery and dilution. The test results should be used in selecting the feed rate, as well as deciding when to re-order chemical, if the strength drops below 2%.

C. FACILITY DESIGN CONSIDERATIONS

This portion of the report presents some of the operational experience relating to facility design. Contrary to the belief during the design of the project, it was discovered during operation that the collector sewer and influent pumping station wet well provides significant storage capacity. Pumped flows appeared to be more controllable than gravity flows. It allowed some additional response time for the operator during the event.

A staged pumping scheme should be considered. That is, a smaller set of pumps say 30 cfs to 60 cfs should be included to handle most of the storm events, with additional larger pumps for the infrequent but severe events.

Odor control system was never operated. Odor has not been a problem. This requirement may need to be reconsidered during future design. On-site space can be provided for a future system if needed, rather than incorporating it as a requirement at all locations. This is the case where sodium hypochlorite is added to the influent.

Other design considerations are as follows:

1. Provide capability to backwash sample lines.
2. Tipping buckets are an excellent method to clean compartments. One flush is usually sufficient to remove sediments. Two flushes are used for the first flush compartment when the flow has been retained for a long period.
3. Although they are considered state-of-the-art, area-velocity flow meters may not operate as intended. Consider alternatives or a backup system to measure the influent flow for process control.
4. Chlorine demand will decrease during an event, similar to first flush of solids. Need to provide automatic capability to decrease chlorine dose rate during an event.
5. Provide sight glass to visually monitor sodium hypochlorite flow.

D. FACILITY OPERATIONS

1. Provide manager sufficient lead-time on notification alarms to allow for response of personnel under poor conditions (flooded streets).

2. Sampling is typically a secondary concern behind facility operations and safety.

3. Translate field sampling plan into an easily understood checklist for operators.

4. Provide an alternative plan and/or access point to collect samples if sample pump and/or samplers fail to operate.

5. Sodium hypochlorite concentration will drop during extended storage from 6 to 3% within two (2) months. Check strength monthly and after dilution (delivery). Provide capability to modify dose based on measured strength of hypochlorite.

E. SAMPLING/EVALUATION

1. Conduct regular meetings to identify problems and modify the sampling program as required. Include a regulatory agency.

2. Prepare bottle labels and chain of custody forms prior to an event.

3. Perform regular maintenance (calibration and repair) on water quality meters (DO, pH, TRC).

4. Bacteria samples require delivery to lab within 4 hours of collection. Lab staff needs to be on-call and available.

5. Record any equipment problems on an event sheet and/or logbook.

6. Prepare equipment for next event. All field sampling and analysis equipment must be ready at the start of an event.

7. Time delay samplers a few minutes to flush sample line.

8. Difficult to obtain sampling of absolute first flush.