Massachusetts Water Resources Authority
Chlorination System Report:
Clinton Treatment Plant

NPDES Permit No. MA0100404

Environmental Quality Department
Report ENQUAD ms 068

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1.0 Introduction

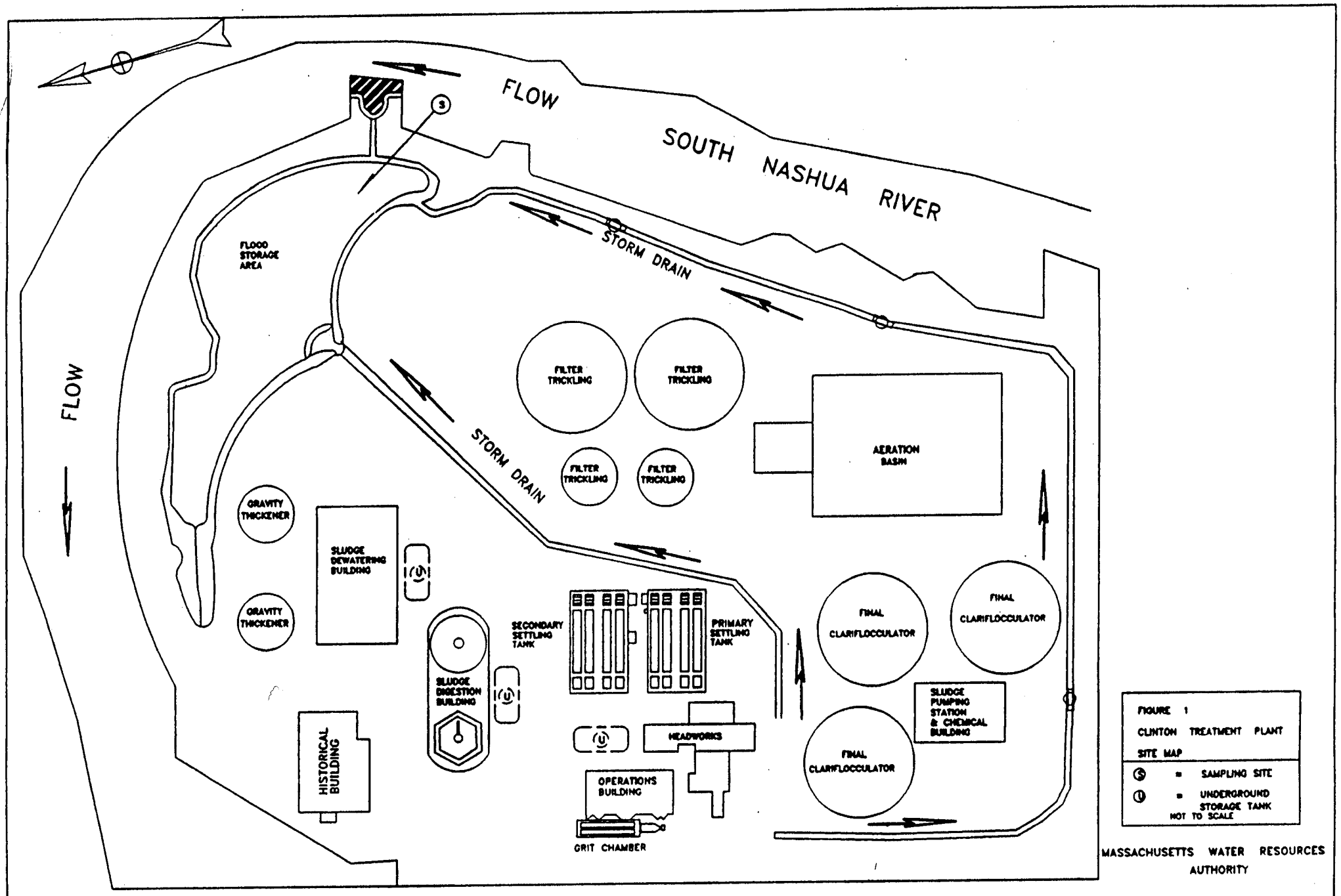
The U.S. Environmental Protection Agency (EPA) and the Massachusetts Department of Environmental Protection (DEP) jointly issued a National Pollution Discharge Elimination System (NPDES) permit for the Massachusetts Water Resources Authority (MWRA) Clinton Treatment Plant facility on September 27, 2000. The permit was issued to comply with the federal Clean Water Act and to meet state water quality standards. The new permit became effective November 26, 2000.

In addition to effluent quality monitoring, the Permit requires MWRA to submit a report on the Clinton Treatment Plant's chlorination system. Part I.D.4 of NPDES Permit No. MA0100404 states in part:

> Within 3 months of the effective date of the permit, the permittee will submit a report documenting the effectiveness of the chlorination and dechlorination system. The report will specifically address how flow variability and chlorine demand variability affect compliance with the TRC and fecal coliform limits at all times. Sampling data shall be provided to support conclusions on how hourly and daily flow and chlorine demand varies affects permit compliance. The report will include a description on chlorination and dechlorination systems and the methods for dosage control. The report will identify all changes necessary to ensure compliance with the TRC and fecal coliform limits at all times, including equipment modifications and upgrades, operational procedures (including calibration procedures and alarm/response procedures), and sampling protocols. The report will include a schedule for implementing all of the necessary changes.

2.0 Clinton Treatment Plant

The Clinton Wastewater Treatment Plant serves the town of Clinton and the Lancaster Sewer District. The plant provides secondary treatment using an activated sludge process in combination with nutrient removal, chlorination, and dechlorination. The major facilities include headworks, primary settling tanks, trickling filters, aeration tanks, secondary settling tanks, sludge digesters, a sludge press, and an off-site dedicated sludge-only landfill. Figure 1 shows the plant layout.

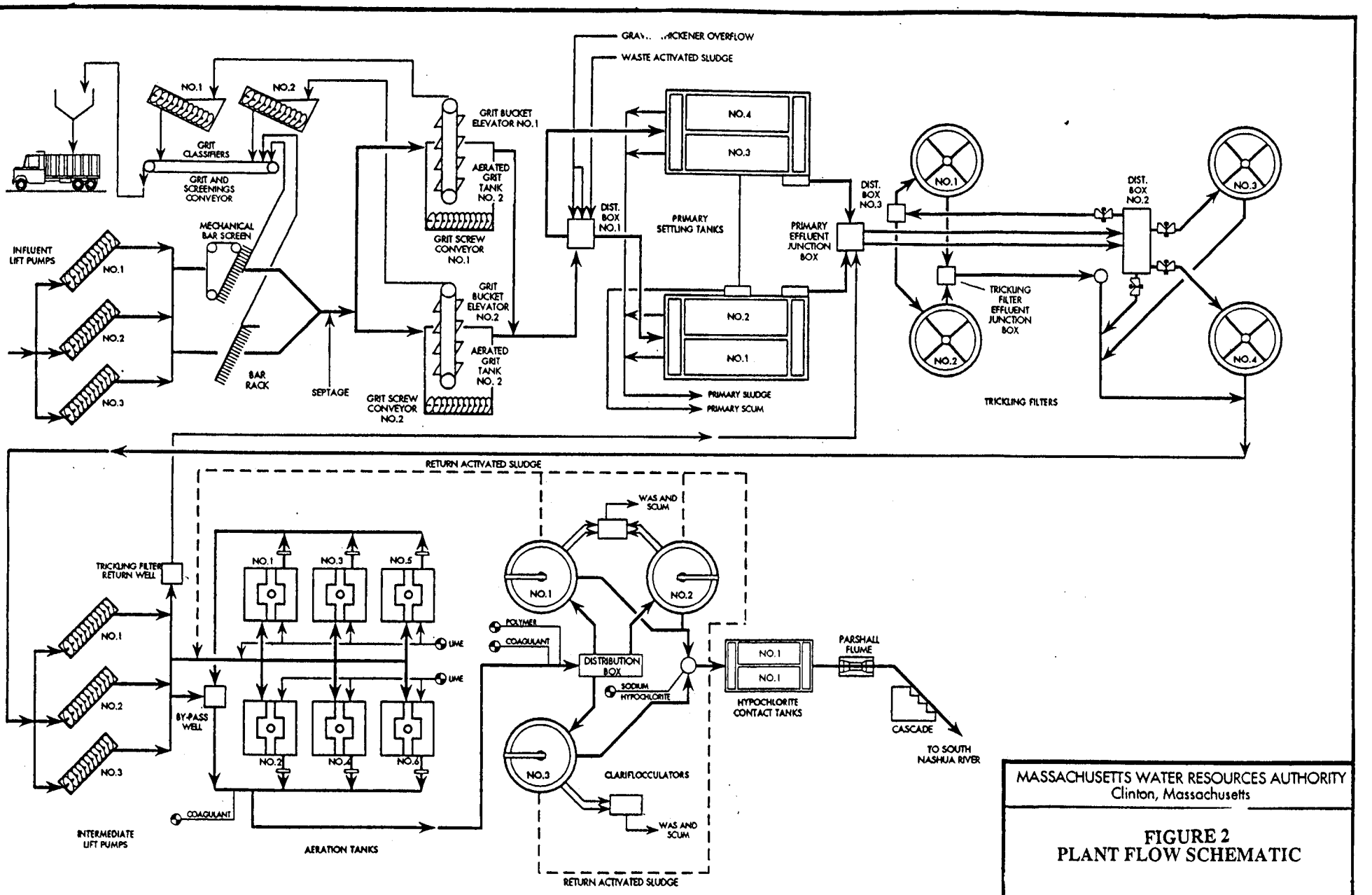

FLOW
SOUTH NASHUA RIVER
FLOW
FLOOD STORAGE AREA
STORM DRAIN
STORM DRAIN
FILTER TRICKLING
FILTER TRICKLING
FILTER TRICKLING
FILTER TRICKLING
AERATION BASIN
GRAVITY THICKENER
GRAVITY THICKENER
SLUDGE DEWATERING BUILDING
SECONDARY SETTLING TANK
PRIMARY SETTLING TANK
SLUDGE DIGESTION BUILDING
FINAL CLARIFLOCCULATOR
FINAL CLARIFLOCCULATOR
FINAL CLARIFLOCCULATOR
SLUDGE PUMPING STATION & CHEMICAL BUILDING
HISTORICAL BUILDING
HEADWORKS
OPERATIONS BUILDING
GRIT CHAMBER
FIGURE 1
CLINTON TREATMENT PLANT
SITE MAP
S = SAMPLING SITE
U = UNDERGROUND STORAGE TANK
NOT TO SCALE
MASSACHUSETTS WATER RESOURCES AUTHORITY

Wastewater from Clinton and the Lancaster Sewer District collects at the headworks for screening and grit removal. The flow then goes to the primary clarifiers, which remove approximately 30% of Biochemical Oxygen Demand (BOD) and 60% of Total Suspended Solids (TSS) from the wastewater. Effluent from primary treatment then goes through trickling filters prior to the aeration basins. At the aeration basins, nitrification is accomplished by extending the sludge retention time from 8 to about 12 days. In addition, phosphorus is removed by alum addition. From the aeration basins, wastewater goes to the clariflocculator for final settling. Secondary treatment removes greater than 85% BOD and TSS. Finally, the effluent enters the disinfection basins where it is chlorinated with sodium hypochlorite and dechlorinated with sodium bisulfite before it is discharged to the South Branch, Nashua River. Scum and sludge removed from the primary tanks and clarifocculator are digested, filter-pressed, and trucked off-site to the sludge-only dedicated landfill. Figure 2 depicts the Clinton Plan process flow schematic.

3.0 Disinfection System

The South Branch, Nashua River is classified by the State as Class B waters. Designated uses for class B waters are primarily: 1) the protection and propagation of fish, other aquatic life and wildlife and, 2) the waters must be suitable for primary and secondary contact recreation. To meet these requirements, treatment facilities usually must disinfect the effluent before discharge. The most common and cost-effective disinfectant used in water and wastewater treatment facilities is chlorine, which is extremely hazardous to handle. Therefore, sodium hypochlorite has been the standard alternative to chlorine. It is equally effective, and far safer.

In either form, effluent chlorination can be extremely toxic to aquatic life. The South Branch, Nashua River may not provide sufficient dilution of the chlorinated effluent to meet the EPA-recommended in-stream criteria for acute and chronic toxicity levels. For this reason, the EPA and DEP issue NPDES permits with stringent limitations on total chlorine residual. To ensure permit compliance, most plants, including Clinton, dechlorinate their effluent prior to discharge.



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Clinton, Massachusetts

FIGURE 2
PLANT FLOW SCHEMATIC

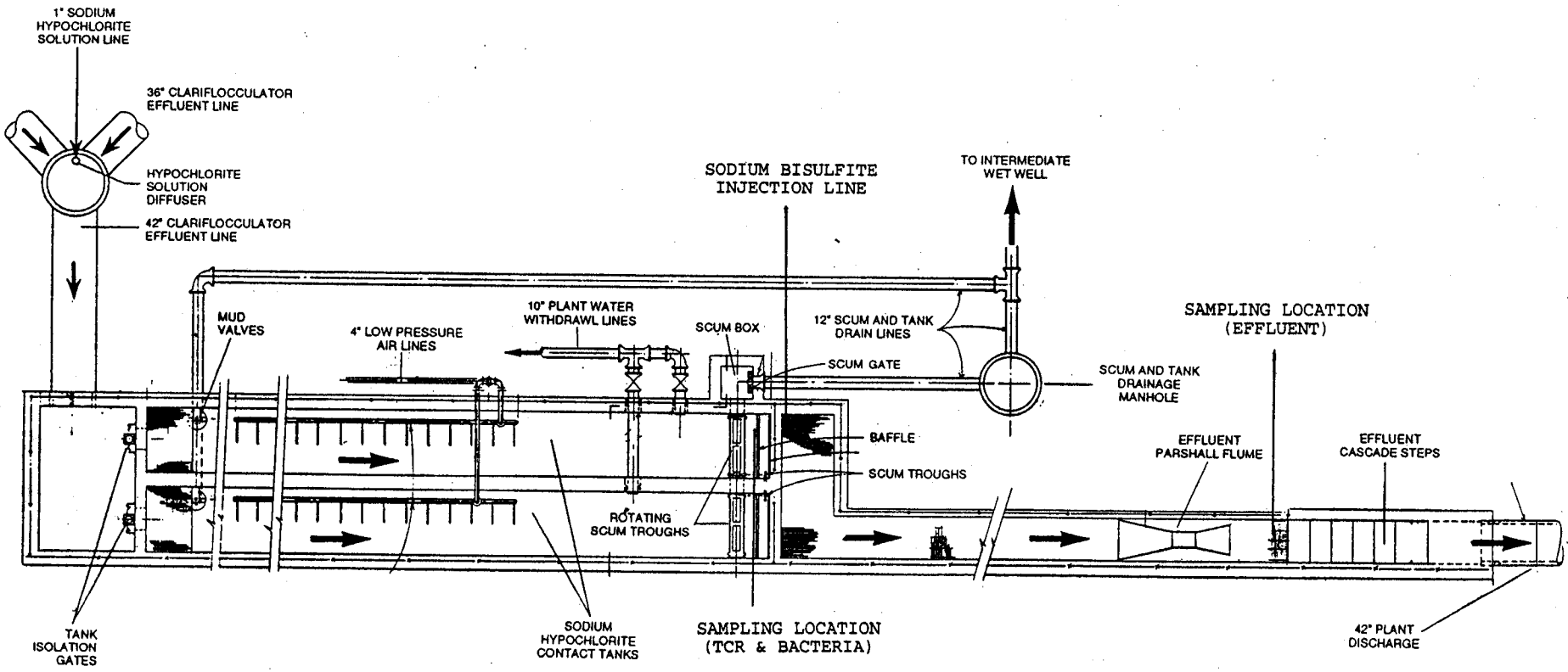
3.1 Chlorination System

The Clinton Treatment Plant is equipped with a sodium hypochlorite disinfection system consisting of two 4200-gallon hypochlorite holding tanks containing 15% sodium hypochlorite solution**,** three chemical metering pumps, flow rotameters, flow indicating transmitters, a calibration tube, an effluent sampler, and associated piping. The system is housed in the Chemical Building.

The addition of hypochlorite is flow-paced with the effluent flow. Hypochlorite is injected into to the clariflocculator effluent junction box downstream of the clariflocculator. The chlorinated effluent then flows into the hypochlorite contact chambers where, based upon flow rate, it receives at least 15 minutes contact time. Within the contact chamber, a gate controls flow into one of two contact tanks. Each tank is equipped with low-pressure air diffusers to provide additional aeration of the effluent. The chlorinated effluent then flows over a weir into the sodium bisulfite dechlorination chamber. Following dechlorination, the effluent flows through the Parshall flume for flow measurement and then over the outfall cascade to be discharged to the river. Figure 3 presents a schematic of the chlorination and dechlorination contact chambers.

Control of the chlorination process is accomplished by pump variable speed flow-pacing, manual dosage adjustment by changing the stroke length on the pump, and monitoring the residual chlorine at the chlorine contact tank effluent weir. The operator sets the desired pump speed at the pump control panel and manually sets the stroke length of the pump. Once the dosage rate is identified and the pump is properly adjusted, the flow of sodium hypochlorite will be controlled by a flow signal received from the effluent flow meter. In this automated mode, the pump continuously delivers a preset dosage of sodium hypochlorite paced with effluent flow.

Certain conditions may make it necessary for plant personnel to manually control the chemical dosing rate to compensate for changes within the process or high chlorine



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Clinton, Massachusetts

FIGURE-3
CHLORINATION
DECHLORINATION SYSTEM

demand in the influent which may affect chlorination effectiveness. These conditions may include:

- Decreased chlorine potency (deterioration in the storage tank)
- Recycling of overflow from digesters
- Introduction of filtrate from the sludge filter press into the wastestream
- Reduced contact time due to high flow
- Flow surge
- Industrial slug discharge, and
- Toxics in the influent
- Low residual chlorine at the end of the contact chamber

When such conditions occur, the operator can manually adjust the addition of sodium hypochlorite by resetting the desired pump speed and manually adjusting the stroke length at the control panel.

Pumps are calibrated to ensure set dosage rates are delivered by the chemical feed pumps. Pump calibrations are periodically conducted by noting the time it takes to pump a known volume of water.

System failures during regular hours are taken care of immediately. An on-call-operator is available to respond on emergencies on weekends or holidays. The Control Panel is equipped with a 24-hour automatic alarm system that is designed to go off when an operational upset or system failure occurs. The hypochlorite system is also equipped with an alarm to provide immediate notification in case of a chlorination system failure. Alarms activated during off-hours are processed through a call box, which is programmed to phone the operator-on-call. Hypochlorite system problems are top priority items. In case of a power outage, sodium hypochlorite feed pumps will continue to operate uninterrupted from backup generator power.

3.2 Dechlorination System

The Clinton Plant is equipped with a sodium bisulfite dechlorination system consisting of one 1200-gallon tank containing 38% bisulfite solution, two chemical metering pumps, a flow rotameter, a diffuser assembly, and associated piping. The system is

fully automated and like the chlorination system, it can be operated manually. The system is also housed in the Chemical Building.

Under normal conditions, the dechlorination process is automatically controlled by flow-pacing the chemical feed pump with effluent flow. Sodium bisulfite application occurs at the diffuser assembly located immediately below the discharge from the hypochlorite contact tanks. The bisulfite is diffused immediately before effluent cascades over the weirs into the effluent channel – see Figure 3. Application occurs at the point of maximum turbulence and allows dosing rate to be optimized.

On certain occasions, it may be necessary to adjust the dosage rate. The amount of sodium bisulfite solution required to dechlorinate effluent varies according to the effluent chlorine residual and other factors. To manually change the dosage rate, the theoretical bisulfite dosage rate must be determined based on the chlorine residual at the end of the hypochlorite contact basin. The pump stroke length is then adjusted manually for the required dosage. Chorine residual measurements are taken regularly at the end of the chlorine contact tank prior to sodium bisulfite injection for process control purposes and at the bottom of the cascade aerator for permit compliance. The effluent is tested three times a day to determine if any changes have occurred.

Similar to the hypochlorite system, the bisulfite pumps are periodically calibrated and are backed up with generator power in case of a power outage. Bisulfite pumps, like hypochlorite pumps, are wired to process alarms. Alarms activated during off-hours are processed identically to hypochlorite process alarms (see 3.1).

4.0 Monitoring Results

This section will address monitoring of the chlorination system, dechlorination system and flow measurement. The monitoring program provides the basis for process control and serves as a record of how the treatment plant is functioning. The laboratory results and meter readings provide valuable information to the operators for identifying problems before they seriously affect effluent quality and preventing future process upsets.

4.1. Flow

There are three flow meters installed: two for influent, and one for effluent. All meters are open channel flow transmitter types that measures flow as the water passes through a Parshall flume. All flows are recorded 24 hours a day in circular flow charts.

4.1.1. Influent Flow

Clinton and Lancaster flows are measured separately by open channel flow transmitters. The transmitters send signals to the central control panel located in the main building where flows are recorded. Two separate totalizers record Clinton and Lancaster flows.

4.1.2. Effluent Flow

The effluent flow-measuring transmitter is located before the effluent channel cascade. The transmitter sends flow rate signals to hypochlorite pumps for effluent chlorination and sodium bisulfite pumps for dechlorination. Flow rate, quantity, and totalizer are displayed and recorded in a 24-hour circular chart at the central control panel. Flow varies from 2 MGD to 4 MGD depending on time of day. Typically, flow increases after 7:00 AM and decreases after 11:00 PM. Figure-5 shows the hourly maximum, minimum and average flows for the past three months. The highest flow recorded during this period was 5 MGD, due to a rainstorm on December 12, 2000. The treatment plant can handle up to 12 MGD, but normally flows never get that high except for storm events. During storm events the plant does not have any problems, demonstrating that the plant is efficiently designed for both high and low flow events.

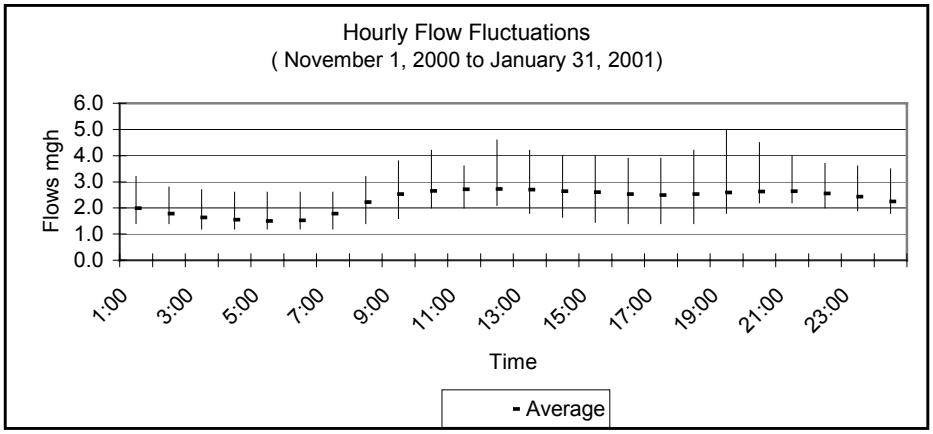


Figure 4: Flow Data from November 1, 2000 to January 31, 2001

4.2 Total Chlorine Residual

Testing effluent for residual chlorine is critical to prevent the undesirable effects of over or under chlorination. Therefore, three times a day, grab samples are taken at the chlorine contact chamber, where the flow is well mixed and easily accessible to samplers. These results are used for process control purposes to make sure enough chlorine is used to treat the effluent. Total chlorine residual measurements of the effluent are also taken three times a day at the cascade before effluent discharge for permit compliance. Each sample is analyzed in the laboratory as soon as collected, using chlorine residual testing procedures from the Standard Method for the Examination of Water and Wastewater, 18th Edition, Method 4500-Cl D Amperometric Titration Method and 4500-Cl E Low Level Amperometric Titration Method.

The Clinton Treatment Plant never exceeded the chlorine residual maximum daily average permit limit of <0.03 mg/L. Final effluent readings have always been <0.03mg/L, proving the plant has a very effective dechlorination system.

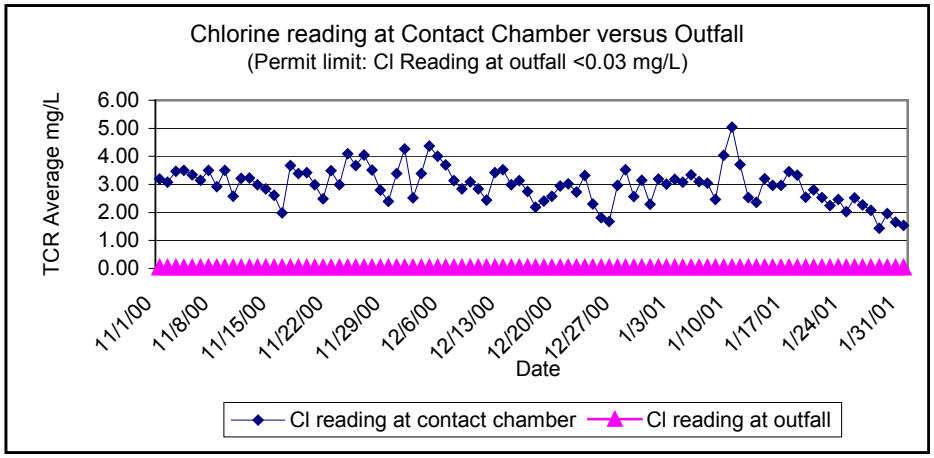


Figure 5: Chlorine reading at outfall location

4.3 Fecal Coliform

Testing for fecal coliform in plant effluent is done to determine the suitability of the effluent for discharge and to meet NPDES permit requirements. Fecal coliform samples are collected three times a day at three-hour intervals at the chlorine contact chamber. The membrane filter technique is used to determine the number of coliform organisms present in the water. The membrane filter technique is presented in Standard Methods for the Examination of Water and Wastewater, 18th Edition, Method 9230 C Membrane Filter Techniques.

Testing results showed that there were no permit violations. The daily maximum permit limit is 400cfu/100 mL, which was never even approached. Results have always been below 25cfu/100ml, showing the effectiveness of the chlorination system.

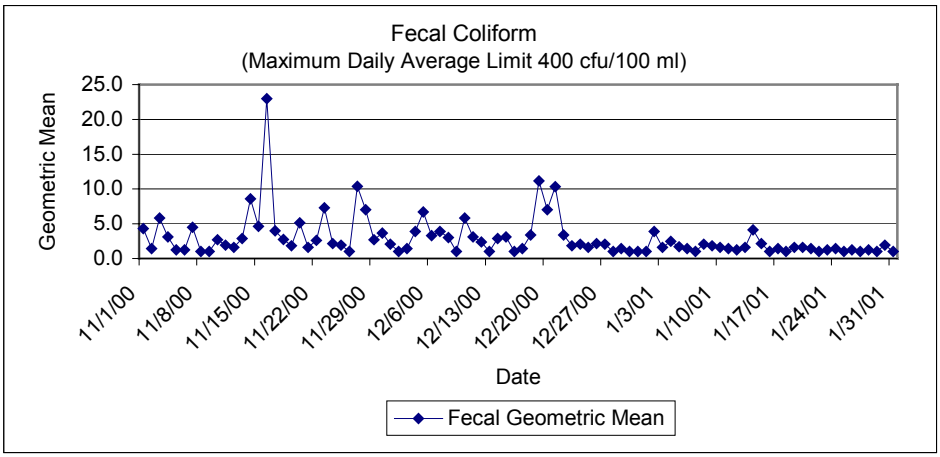
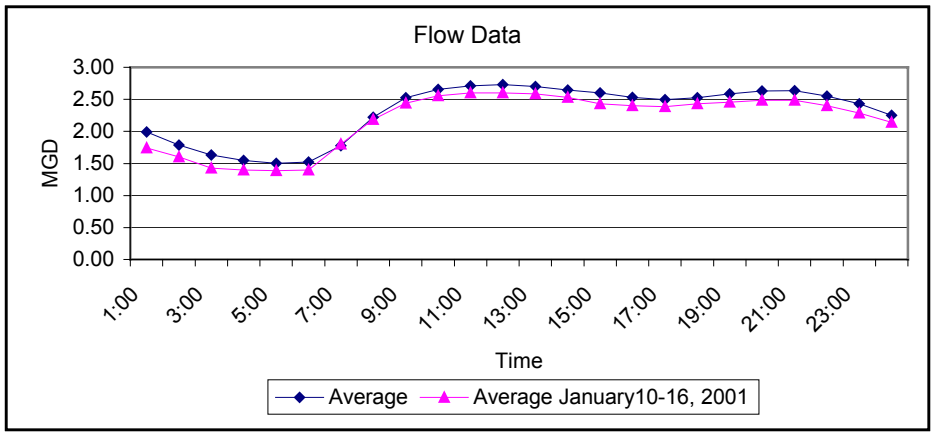


Figure 6: Fecal coliform reading

4.4 Flow vs. Chlorine Dosing Rate

Between January 10-16, 2001, the MWRA conducted a special study to examine the relationship between flow rate and hypochlorite feed rate. As can seen in Fig-5, the flow data for this period was very similar to the flow data for the three month



November to January period.

Figure 7: Average Flow from November 2000-January 2001 versus January 10-16,2001

Examination of flow fluctuations and hypochlorite dosing rates (Figures 8, 9) shows a strong positive relationship between flow and hypochlorite dosing rate. In other words, the chlorination system is working as designed – between automatic flow-pacing and the operator's ability to manually fine-tune hypochlorite dosing, the chlorination system at the Clinton Treatment Plant has been effective in both matching

influent flow and keeping fecal coliform counts well below permit limits (Figures 6, 9).

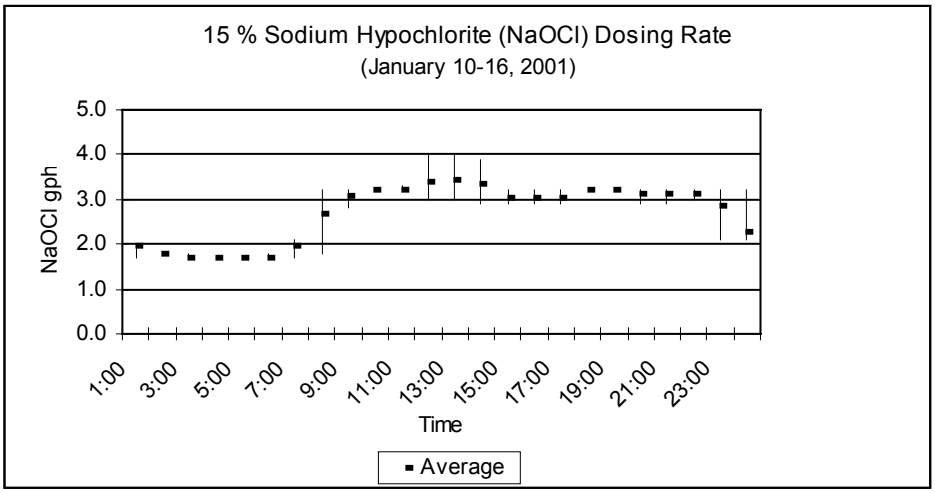


Figure-8: 15% Sodium Hypochlorite (NaOCl) Feed Rate

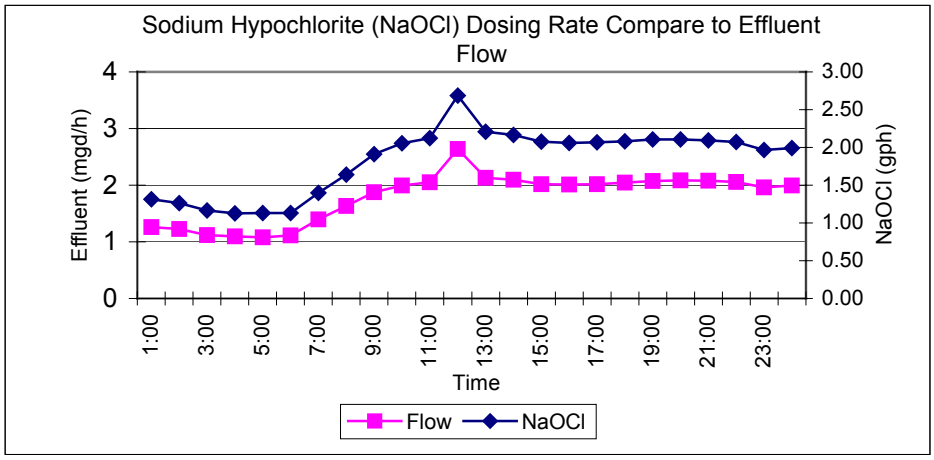


Figure 9: Sodium Hypochlorite (NaOCl) dosing rate compare to effluent flow

5.0 Conclusion

The disinfection system at the Clinton Wastewater Treatment Plant appears to be working to protect the water quality of the Nashua River as designed. Fecal coliform counts in the plant's effluent are far below both the monthly average and daily maximum limits of, respectively, 200 and 400 colonies per 100 mL. Typically, geometric means of daily fecal coliform counts are under 10 (Figure 6), and total residual chlorine in the effluent is less than 0.03 mg/L (Figure 5). The monthly average and daily maximum limits for chlorine residual are 17.6 and 30.4 mg/L respectively. Therefore, the disinfection system fulfills its mission of both neutralizing fecal coliform bacteria and ecologically toxic chlorine before effluent discharge into the Nashua River.

Both the chlorination and dechlorination systems show the flexibility to handle sudden changes in flow conditions. Sodium hypochlorite addition closely follows flow, even during the sudden rise in plant flow that occurs every morning starting between 7 and 9 AM. Hypochlorite dosing rate followed both the general curve and a noontime spike in flow quite closely during the January 10-16 study period (Figure 9). Excellent process control in the plant helps to achieve this efficiency, with the manual controls allowing operators to match dosing to flow with great precision. Plant personnel also closely monitor the disinfection system through a rigorous monitoring program, sampling for fecal coliform and total residual chlorine in the effluent three times a day.

Tight process control and daily monitoring are only two tools the Clinton Wastewater Treatment Plant possesses to handle mishaps that may affect effluent disinfection. In case of a general power failure, backup generators can power both chlorination and dechlorination pumps. In addition to the generators, there are two backup pumps for hypochlorite and a single backup pump for bisulfite, creating a layer of redundancy for pump operations. The redundancy also allows for more frequent pump maintenance, further increasing reliability. Finally, any problems with either the hypochlorite or bisulfite feed pumps are considered priority problems. This ensures that operators are alerted to the problem immediately, even during off-hours.

Although the disinfection system at Clinton Wastewater Treatment Plant deserves commendation for its effectiveness, a potential improvement could be made. Further optimization of hypochlorite dosing, if possible, could result in less use of hypochlorite, subsequently leading to reduced use of bisulfite. The result is potential cost savings by reducing the amount of chemicals purchased.

Regardless of future improvements, currently disinfection at Clinton Wastewater Treatment Plant has been extremely effective in two realms: preventing bacterial contamination of the South Nashua River, and neutralizing the potentially deadly effects of chlorination on receiving waters. The effectiveness and safety of the disinfection system speaks in the plant's compliance record: no violations of either the fecal coliform or the total residual chlorine permit limits.

6.0 References

CDM. 1994. *Clinton Wastewater Treatment Plant, Operations and Maintenance Manual. Volume II-Operations*. Cambridge, MA: Camp Dresser & McKee Inc.

GIA, Inc. 1992. *Clinton Wastewater Treatment Plant Dechlorination Facilities, Operation and Maintenance Manual*. Medford, MA: Green International Affiliates, Inc.

APPENDICES

Appendix A: Hourly Flow Rate, November 2000-January 2001

November 2000 Hourly Flow (mgd)

DATE	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	23:59
11/01/00	1.80	1.70	1.40	1.40	1.30	1.40	1.80	2.50	3.00	2.80	2.70	2.60	2.40	2.40	3.60	2.40	2.30	2.40	2.50	2.60	2.80	2.60	2.40	2.20
11/02/00	2.40	2.20	2.00	1.80	1.80	1.70	2.00	2.60	2.90	2.60	2.50	2.40	2.20	*	*	*	*	*	3.20	3.20	3.30	3.00	3.00	2.60
11/03/00	1.70	1.50	1.40	1.20	1.20	1.20	1.20	2.80	2.80	2.80	2.00	2.20	2.20	2.20	2.30	2.20	2.20	2.30	2.40	2.40	2.40	2.30	2.20	1.90
11/04/00	1.60	1.60	1.40	1.30	1.20	1.20	1.20	1.50	2.20	2.50	2.80	2.80	2.70	2.60	2.40	2.40	2.20	2.20	2.20	2.20	2.20	2.00	1.90	1.80
11/05/00	1.70	1.50	1.40	1.20	1.20	1.20	1.60	1.40	2.00	2.20	2.50	2.70	2.80	2.70	2.60	2.50	2.40	2.40	2.40	2.50	2.60	2.60	2.40	2.20
11/06/00	1.60	1.40	1.20	1.20	1.20	1.30	1.80	2.40	2.60	2.60	2.50	2.40	2.40	2.30	2.20	2.10	2.00	2.30	2.40	2.40	2.50	2.40	2.20	2.20
11/07/00	1.60	1.40	1.30	1.30	1.20	1.20	2.00	2.50	2.60	2.60	2.40	2.40	2.30	2.20	2.10	2.00	2.00	2.20	2.30	2.40	2.40	2.40	2.20	1.80
11/08/00	1.60	1.60	1.40	1.20	1.20	1.30	2.00	2.30	2.60	2.60	2.50	2.40	2.30	2.20	2.20	2.20	2.20	2.10	2.20	2.40	2.40	2.40	2.20	2.00
11/09/00	1.60	1.60	1.40	1.40	1.30	1.40	1.80	2.40	2.60	2.50	2.40	2.40	2.20	2.10	2.00	2.10	2.00	2.10	2.20	2.30	2.30	2.20	2.20	2.00
11/10/00	2.20	1.80	1.80	1.60	1.60	1.60	2.20	2.40	3.80	4.20	3.20	3.00	3.20	3.70	3.20	3.00	2.80	2.80	2.70	2.60	2.60	2.50	2.40	2.30
11/11/00	2.00	1.80	1.70	1.60	1.60	1.60	1.60	2.00	2.40	2.80	3.20	3.20	3.20	3.00	2.80	2.60	2.60	2.60	2.50	2.50	2.50	2.40	2.30	2.20
11/12/00	1.80	1.60	1.60	1.40	1.50	1.60	1.60	2.00	2.40	2.60	3.00	3.00	2.80	2.80	2.70	2.60	2.60	2.50	2.50	2.60	2.60	2.50	2.40	2.20
11/13/00	2.20	1.60	1.60	1.40	1.60	1.60	2.20	2.40	2.70	2.70	2.60	2.60	2.50	2.40	2.40	2.30	2.40	2.60	2.60	2.60	2.60	2.50	2.30	2.30
11/14/00	2.40	2.20	1.80	1.80	1.70	1.80	2.20	2.60	2.80	2.70	2.60	2.50	2.50	2.40	2.50	2.60	2.70	3.20	3.40	3.40	3.00	2.80	2.80	2.60
11/15/00	2.20	2.00	1.80	1.70	1.70	2.00	2.40	3.00	2.80	2.80	2.80	*	*	*	*	*	3.10	3.20	3.30	3.00	3.00	2.80	2.70	2.50
11/16/00	2.00	1.80	1.60	1.60	1.60	1.70	2.20	3.00	3.40	2.40	3.20	2.60	2.80	2.80	3.00	3.60	3.50	3.50	3.50	3.50	3.40	2.70	2.60	2.40
11/17/00	2.00	1.80	1.70	1.60	1.60	1.70	2.00	2.70	2.80	3.00	2.80	2.80	2.80	2.70	2.60	2.60	2.60	2.50	2.50	2.60	2.60	2.50	2.40	2.20
11/18/00	2.00	1.80	1.70	1.60	1.50	1.40	1.60	2.00	2.40	2.60	3.00	2.80	3.00	2.90	2.70	2.60	2.60	2.60	2.60	2.50	2.40	2.40	2.20	2.10
11/19/00	1.90	1.70	1.60	1.60	1.40	1.50	1.50	1.70	2.20	2.50	2.80	3.00	3.00	2.80	2.80	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.20
11/20/00	1.80	1.60	1.40	1.60	1.40	1.60	2.40	2.80	3.00	2.70	2.80	2.60	2.60	2.50	2.40	2.40	2.40	2.50	2.60	2.70	2.70	2.60	2.50	2.40
11/21/00	2.00	1.80	1.60	1.50	1.50	1.50	2.00	2.60	2.80	2.80	2.60	2.60	2.40	2.40	2.40	2.40	2.40	2.30	2.40	2.50	2.60	2.60	2.60	2.50
11/22/00	1.80	1.80	1.60	1.40	1.40	1.40	1.80	2.40	2.70	2.80	2.80	2.70	2.60	2.60	2.60	2.40	2.40	2.50	2.60	2.60	2.60	2.50	2.40	2.20
11/23/00	1.70	1.60	1.40	1.40	1.40	1.40	1.60	1.60	2.40	3.00	3.10	3.00	2.80	2.80	2.60	2.40	2.20	2.20	2.20	2.20	2.20	2.20	2.00	2.00
11/24/00	1.80	1.60	1.50	1.40	1.40	1.40	1.60	1.80	2.30	2.40	2.60	2.80	2.70	2.60	2.50	2.40	2.40	2.40	2.40	2.40	2.40	2.20	2.10	2.00
11/25/00	1.90	1.80	1.50	1.40	1.40	1.40	1.30	1.60	1.90	2.40	2.60	2.80	2.80	2.70	2.60	2.50	2.40	2.40	2.40	2.40	2.40	2.20	2.10	2.00
11/26/00	2.30	1.80	1.70	1.60	1.50	1.50	1.80	1.40	1.80	2.20	2.40	2.60	3.00	3.40	3.40	3.70	3.50	3.20	3.00	3.20	3.20	2.80	2.70	2.40
11/27/00	2.20	1.80	1.60	1.60	1.50	1.50	1.80	2.40	2.60	2.80	2.80	2.60	2.60	2.50	2.40	2.40	2.40	2.40	2.50	2.60	2.70	2.70	2.60	2.40
11/28/00	2.30	1.80	1.60	1.60	1.40	1.60	1.80	2.40	2.70	2.70	2.70	2.60	2.40	2.40	2.40	2.40	2.20	2.40	2.40	2.60	2.60	2.80	2.60	2.50
11/29/00	2.20	2.00	1.70	1.60	1.60	1.60	1.80	2.60	2.80	2.80	2.60	2.50	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.60	2.70	2.70	2.60	2.50
11/30/00	2.20	1.80	1.80	1.60	1.60	1.80	2.40	2.70	2.70	2.70	2.70	2.60	2.60	2.50	2.50	2.50	2.40	2.50	2.60	2.70	2.70	2.60	2.40	2.20

* No discharge to river. Flow diverted to clariflocculators to allow for downstream work

December 2000 Hourly Flow (mgd)

DATE	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	23:59
12/01/00	2.00	1.80	1.70	1.60	1.50	1.50	1.50	2.00	2.40	2.60	2.80	2.60	2.60	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.50	2.50	2.40	2.20
12/02/00	1.90	1.80	1.60	1.60	1.40	1.50	1.50	1.80	2.30	2.70	2.80	2.80	2.80	2.80	2.70	2.60	2.60	2.50	2.50	2.50	2.40	2.40	2.20	2.20
12/03/00	1.80	1.70	1.50	1.40	1.40	1.60	1.60	1.80	2.40	2.60	2.80	2.80	2.80	2.80	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.50	2.30
12/04/00	1.80	1.70	1.50	1.40	1.40	1.60	2.20	2.60	2.80	2.70	2.60	2.50	2.40	2.40	2.40	2.30	2.30	2.40	2.50	2.60	2.60	2.50	2.40	2.20
12/05/00	1.90	1.70	1.60	1.40	1.40	1.60	2.40	2.60	2.70	2.80	2.60	2.50	2.50	2.40	2.20	2.20	2.20	2.20	2.30	2.60	2.70	2.70	2.50	2.20
12/06/00	1.90	1.60	1.50	1.40	1.40	1.50	2.00	2.70	2.70	2.60	2.40	2.50	2.40	2.40	2.40	2.20	2.20	2.30	2.40	2.50	2.60	2.60	2.40	2.20
12/07/00	2.10	1.80	1.60	1.40	1.40	1.60	2.20	2.60	2.80	2.60	2.50	2.50	2.40	2.40	2.30	2.30	2.20	2.40	2.50	2.60	2.60	2.60	2.40	2.10
12/08/00	2.50	2.40	2.40	2.40	2.40	2.50	2.60	2.60	2.50	2.40	2.20	2.10	1.80	1.65	1.45	1.40	1.40	1.40	1.80	2.50	2.70	2.60	2.60	2.50
12/09/00	1.80	1.80	1.60	1.40	1.40	1.40	1.40	1.60	2.00	2.60	2.80	3.00	3.00	2.80	2.70	2.60	2.60	2.60	2.40	2.40	2.40	2.20	2.00	2.00
12/10/00	1.80	1.80	1.40	1.40	1.40	1.40	1.60	1.40	1.80	2.40	2.60	3.00	3.00	2.80	2.80	2.60	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.20
12/11/00	1.80	1.70	1.60	1.50	1.50	1.50	1.80	2.50	2.60	2.60	2.60	2.60	2.60	2.40	2.50	2.50	2.50	2.50	2.50	2.60	2.60	2.60	2.50	2.20
12/12/00	1.80	1.70	1.50	1.40	1.40	1.40	1.50	2.20	2.80	2.70	2.60	2.60	2.60	2.40	3.00	2.20	2.20	2.40	2.80	2.60	2.60	2.60	2.60	2.40
12/13/00	2.00	1.70	1.50	1.40	1.40	1.40	1.70	2.20	2.60	2.60	2.50	2.50	2.40	2.20	2.20	2.20	2.20	2.20	2.40	2.50	2.50	2.50	2.40	2.20
12/14/00	2.00	1.60	1.50	1.50	1.40	1.40	1.60	2.20	2.40	2.40	2.60	2.60	2.60	2.60	2.60	2.50	2.40	2.40	2.40	2.40	2.60	2.60	2.50	2.20
12/15/00	2.00	1.80	1.60	1.50	1.40	1.40	1.40	2.30	2.60	2.60	2.60	2.60	2.50	2.50	2.20	2.20	2.20	2.40	2.40	2.60	2.60	2.50	2.40	2.00
12/16/00	2.20	2.20	2.20	2.00	1.80	1.60	1.80	1.80	2.00	2.40	2.80	2.90	2.80	2.70	2.60	2.60	2.50	2.40	2.40	2.40	2.30	2.20	2.10	2.20
12/17/00	3.20	2.80	2.70	2.60	2.60	2.60	2.60	2.50	2.60	3.00	3.50	4.60	4.20	4.00	4.00	3.90	3.90	4.20	5.00	4.50	4.00	3.70	3.60	3.50
12/18/00	2.80	2.60	2.40	2.40	2.30	2.30	2.40	3.20	3.70	3.50	3.60	3.50	3.30	3.40	3.20	3.20	3.20	3.20	3.30	3.30	3.40	3.30	3.20	3.00
12/19/00	2.80	2.60	2.40	2.40	2.20	2.30	2.40	3.00	3.50	3.30	3.20	3.20	3.20	3.20	3.20	3.00	3.00	3.00	3.20	3.20	3.20	3.20	3.00	3.00
12/20/00	2.60	2.50	2.20	2.00	2.00	2.00	2.40	2.80	3.00	3.20	3.20	3.20	3.20	3.20	3.20	3.00	3.00	3.20	3.20	3.20	3.20	3.00	3.00	2.90
12/21/00	2.60	2.40	2.10	2.00	2.00	2.00	2.30	2.80	3.20	3.20	3.00	3.00	3.00	2.20	3.00	3.00	2.80	2.80	3.00	3.00	3.00	2.90	2.80	2.80
12/22/00	2.40	2.20	2.00	2.00	1.80	1.80	2.00	2.50	3.00	3.20	3.20	3.20	3.20	3.20	3.00	2.90	2.90	2.80	2.90	2.90	2.90	2.80	2.70	2.60
12/23/00	2.40	2.20	2.00	1.90	1.80	1.80	2.00	2.20	2.60	3.00	3.60	3.60	3.50	3.40	3.20	3.00	3.00	2.90	2.80	2.80	2.80	2.80	2.50	2.40
12/24/00	2.20	2.00	1.90	1.90	1.80	1.80	1.90	2.10	2.60	3.20	3.30	3.40	3.40	3.30	3.20	3.20	3.00	2.80	2.80	2.80	2.60	2.40	2.40	2.40
12/25/00	2.00	1.90	1.80	1.70	1.70	1.80	1.90	2.00	2.40	2.60	2.80	3.00	3.00	3.20	2.80	2.80	2.60	2.60	2.60	2.60	2.60	2.50	2.50	2.40
12/26/00	2.30	2.00	1.80	1.70	1.70	1.50	1.70	2.20	2.40	2.60	3.00	3.30	3.40	3.20	3.00	2.80	2.80	2.80	2.90	2.80	2.80	2.80	2.60	2.40
12/27/00	2.20	1.80	1.70	1.70	1.60	1.60	2.00	2.20	2.50	2.80	3.10	3.00	3.00	3.00	2.90	2.80	2.70	2.60	2.60	2.80	2.70	2.60	2.60	2.40
12/28/00	2.00	2.00	1.80	1.70	1.60	1.60	1.80	2.20	2.40	2.60	2.80	3.00	2.90	2.80	2.75	2.60	2.60	2.60	2.60	2.70	2.60	2.60	2.40	2.20
12/29/00	1.90	1.80	1.70	1.60	1.50	1.40	1.60	2.10	2.40	2.60	2.80	2.90	2.90	2.80	2.60	2.60	2.60	2.55	2.60	2.60	2.60	2.30	2.20	2.00
12/30/00	2.00	1.80	1.70	1.60	1.60	1.50	1.60	1.80	2.00	2.50	2.60	2.80	2.85	2.85	2.80	2.80	2.80	2.80	2.80	2.60	2.60	2.55	2.40	2.20
12/31/00	2.00	1.80	1.80	1.70	1.60	1.50	1.60	1.60	1.85	2.40	2.60	2.80	2.90	3.00	3.00	2.80	2.75	2.75	2.60	2.60	2.60	2.40	2.20	2.00

January 2001 Hourly Flow (mgd)

DATE	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	23:59
01/01/01	l.9	1.70	1.50	1.40	1.40	1.40	1.50	1.50	1.70	2.10	2.50	2.60	2.80	3.00	2.90	2.80	2.60	2.60	2.60	2.60	2.60	2.60	2.50	2.20
01/02/01	2.00	1.80	1.70	1.50	1.40	1.40	1.70	2.40	2.60	2.60	2.60	2.60	2.60	2.60	2.50	2.40	2.40	2.40	2.50	2.60	2.70	2.70	2.60	2.30
01/03/01	2.00	1.80	1.70	1.60	1.50	1.50	1.70	2.40	2.80	2.80	2.60	2.60	2.50	2.50	2.40	2.40	2.30	2.40	2.40	2.60	2.70	2.60	2.50	2.30
01/04/01	2.00	1.80	1.60	1.50	1.50	1.50	1.60	2.40	2.60	2.70	2.60	2.60	2.50	2.50	2.40	2.40	2.40	2.40	2.50	2.60	2.60	2.70	2.60	2.40
01/05/01	2.10	1.80	1.60	1.60	1.50	1.40	1.50	2.30	2.60	2.70	2.60	2.50	2.50	2.40	2.40	2.40	2.40	2.40	2.50	2.50	2.60	2.50	2.40	2.20
01/06/01	2.00	1.80	1.70	1.60	1.60	1.40	1.40	1.60	1.80	2.30	2.60	2.80	2.90	2.80	2.80	2.70	2.60	2.60	2.60	2.60	2.50	2.40	2.20	2.10
01/07/01	1.80	1.60	1.50	1.40	1.40	1.40	1.50	1.50	1.80	2.30	2.60	2.90	3.00	3.00	2.80	2.70	2.60	2.60	2.60	2.60	2.60	2.60	2.40	2.20
01/08/01	2.00	1.60	1.60	1.40	1.40	1.40	1.60	2.20	2.60	2.70	2.70	2.60	2.60	2.50	2.50	2.40	2.40	2.40	2.40	2.50	2.60	2.60	2.50	2.20
01/09/01	2.00	1.60	1.50	1.40	1.40	1.40	1.60	2.40	2.60	2.60	2.50	2.50	2.40	2.30	2.30	2.20	2.20	2.30	2.40	2.50	2.60	2.60	2.50	2.30
01/10/01	1.80	1.60	1.40	1.40	1.40	1.50	2.00	2.60	2.60	2.60	2.60	2.50	2.40	2.30	2.30	2.30	2.20	2.40	2.50	2.60	2.60	2.50	2.40	2.00
01/11/01	1.80	1.60	1.40	1.40	1.40	1.40	1.80	2.40	2.60	2.60	2.60	2.40	2.40	2.40	2.30	2.30	2.30	2.40	2.40	2.50	2.60	2.50	2.40	2.00
01/12/01	1.80	1.60	1.40	1.40	1.40	1.40	2.00	2.50	2.60	2.60	2.60	2.50	2.40	2.30	2.30	2.30	2.20	2.40	2.40	2.40	2.40	2.20	2.20	2.00
01/13/01	1.80	1.60	1.60	1.40	1.40	1.30	1.40	1.70	2.20	2.60	2.80	3.00	2.90	2.80	2.60	2.50	2.50	2.40	2.40	2.30	2.20	2.20	2.00	2.00
01/14/01	1.80	1.60	1.40	1.40	1.40	1.40	1.40	1.50	2.10	2.50	2.70	2.90	2.90	2.80	2.60	2.60	2.50	2.40	2.40	2.40	2.40	2.20	2.10	2.00
01/15/01	1.40	1.60	1.40	1.40	1.40	1.40	2.00	2.00	2.40	2.40	2.40	2.50	2.70	2.80	2.60	2.50	2.60	2.60	2.60	2.60	2.60	2.60	2.50	2.80
01/16/01	1.80	1.60	1.40	1.40	1.30	1.40	2.00	2.60	2.60	2.60	2.50	2.40	2.40	2.30	2.30	2.30	2.40	2.40	2.50	2.60	2.60	2.60	2.40	2.20
01/17/01	1.80	1.60	1.40	1.40	1.40	1.40	1.60	2.40	2.60	2.70	2.60	2.50	2.40	2.40	2.40	2.40	2.40	2.30	2.40	2.50	2.60	2.60	2.50	2.30
01/18/01	1.90	1.70	1.50	1.40	1.40	1.40	1.70	2.40	2.60	2.60	2.60	2.50	2.40	2.30	2.20	2.20	2.20	2.30	2.30	2.50	2.60	2.50	2.40	2.10
01/19/01	1.90	1.70	1.60	1.40	1.40	1.40	1.40	2.40	2.60	2.60	2.50	2.50	2.50	2.40	2.40	2.40	2.40	2.40	2.40	2.50	2.50	2.40	2.20	2.10
01/20/01	1.90	1.70	1.60	1.50	1.40	1.30	1.30	1.60	1.90	2.40	2.70	2.90	2.80	2.60	2.60	2.60	2.50	2.40	2.40	2.40	2.40	2.20	2.20	2.00
01/21/01	1.90	1.40	1.40	1.30	1.30	1.20	1.40	1.40	1.70	2.00	2.30	2.60	2.80	2.90	2.80	2.80	2.70	2.60	2.60	2.60	2.60	2.50	2.40	2.00
01/22/01	1.80	1.60	1.40	1.40	1.30	1.30	1.60	2.40	2.60	2.60	2.60	2.50	2.40	2.40	2.40	2.30	2.20	2.20	2.40	2.40	2.50	2.50	2.40	2.10
01/23/01	1.80	1.60	1.50	1.40	1.30	1.40	1.60	2.20	2.60	2.60	2.50	2.40	2.40	2.40	2.40	2.30	2.20	2.30	2.40	2.50	2.60	2.60	2.40	2.20
01/24/01	1.80	1.70	1.50	1.40	1.40	1.40	1.70	2.40	2.70	2.70	2.60	2.60	2.50	2.50	2.40	2.40	2.30	2.30	2.40	2.50	2.50	2.50	2.40	2.00
01/25/01	1.80	1.60	1.40	1.40	1.30	1.40	1.50	2.40	2.60	2.60	2.60	2.50	2.40	2.20	2.30	2.20	2.20	2.20	2.40	2.50	2.60	2.50	2.40	2.20
01/26/01	1.80	1.60	1.50	1.50	1.40	1.30	1.40	2.40	2.60	2.60	2.60	2.60	2.50	2.40	2.20	2.20	2.20	2.20	2.40	2.40	2.30	2.20	2.20	2.00
01/27/01	1.70	1.60	1.40	1.40	1.20	1.20	1.20	1.60	2.00	2.50	2.70	2.80	2.90	2.70	2.60	2.50	2.40	2.40	2.40	2.40	2.20	2.10	2.00	1.90
01/28/01	1.90	1.60	1.40	1.30	1.20	1.20	1.40	1.40	1.60	2.20	2.60	2.80	2.90	2.90	2.90	2.70	2.60	2.60	2.50	2.50	2.40	2.40	2.20	2.10
01/29/01	1.90	1.60	1.40	1.40	1.30	1.30	1.50	2.20	2.60	2.60	2.50	2.50	2.40	2.40	2.40	2.30	2.20	2.40	2.40	2.50	2.60	2.50	2.40	2.10
01/30/01	2.00	1.80	1.60	1.40	1.40	1.40	1.60	2.20	2.60	2.60	2.60	2.50	2.40	2.40	2.50	2.60	2.80	2.80	2.70	2.70	2.80	2.70	2.60	2.30
01/31/01	2.00	1.80	1.60	1.40	1.40	1.50	1.80	2.20	2.80	2.70	2.70	2.60	2.60	2.40	2.40	2.40	2.50	2.60	2.60	2.70	2.70	2.60	2.50	2.40

Appendix B: Monthly Operational Logs, November 2000-January 2001

Receiving Stream:

Plant: Clinton WWTP
Town or City: Clinton
Month: 11/2000
Chief Operator: J. Riccio
Assistant Chief Operator: R. Gorham

DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING
DIVISION OF WATER POLLUTION CONTROL
MONTHLY OPERATION AND MAINTENANCE REPORT

Region: New England
County: Worcester
If Contract Operation, Company _____ Chief Operator Centification of Report ___

Permit #: State M134 Fed. MA0100404

Plant Design Flow ____ mgd.
Monthly Average Flow ____ mgd.
Monthly Average Flow Last Year ____ mgd.

Date: December 29, 2000

COMPLETE STAFFING PLAN MUST BE SUBMITTED IN JUNE AND JANUARY OF EACH YEAR, OR WHEN ANY PERSONNEL CHANGES OCCUR

This Plant was in Complete Permit Compliance this Month. YES NO

	Weather			Sewage Flows (mgd)				Grit	Disinfection		Settleable Solids				pH			
Date	rain 1	temp 2	inf temp 3	max 4	min 5	total 6	bypass 7	cu.ft. 8	GPD 9	CL2 RESID < 10	raw 11	pri. eff 12	sec. eff 13	final 14	Influent		Effluent	
															Hi	Low	Hi	Low
1		58	18.2	4.5	1.3	2.133		3	80	0.03	6.0	0.1	5.0	0.0	7.34		7.36	
2		66	17.5	3.4	1.6	1.837		3	80	0.03	9.0	0.2	3.0	0.0	7.03		6.83	
3		66	17.3	3.1	1.2	1.889		3	120	0.03	10.0	0.0	2.5	0.0	6.83		7.12	
4		69		2.9	1.2	1.844		3	80	0.03				0.0			7.48	
5		47		2.8	1.2	1.934		3	70	0.03				0.0			7.44	
6		53	17.1	2.7	1.2	1.911		3	80	0.03	10.0	0.3	1.5	0.0	7.25		7.50	
7		62	16.9	2.6	1.2	1.869		3	80	0.03	10.0	0.1	1.5	0.0	7.03		7.49	
8		61	17.3	2.6	1.2	1.889		3	90	0.03	12.0	0.1	1.0	0.0	7.34		7.55	
9		54	16.8	2.6	1.3	1.877		3	75	0.03	13.0	0.3	1.3	0.0	7.14		7.16	
10		57	14.6	4.4	1.6	2.461		3	75	0.03	7.0	0.2	6.0	0.0	7.07		7.50	
11		52		3.3	1.5	2.192		3	100	0.03				0.0			7.46	
12		57		3.3	1.4	2.116		3	90	0.03				0.0			7.45	
13		46	16.1	2.6	1.4	2.112		3	80	0.03	8.0	0.2	1.5	0.0	7.12		7.52	
14		50	16.2	3.8	1.6	2.379		3	80	0.03	9.0	0.2	0.6	0.0	6.98		7.66	
15		48	17.0	3.3	1.6	1.916		3	60	0.03	7.0	0.2	1.0	0.0	7.25		7.57	
16		50	16.3	5.0	1.6	2.557		3	90	0.03	10.0	0.1	2.8	0.0	7.14		7.27	
17		56	16.4	3.9	1.6	2.199		3	100	0.03	8.0	0.1	0.8	0.0	7.02		6.92	
18		48		3.4	1.4	2.154		3	100	0.03				0.0			7.53	
19		46		3.4	1.4	2.155		3	90	0.03				0.0			7.47	
20		49	14.9	3.2	1.4	2.153		3	100	0.03	11.0	0.1	1.0	0.0	7.60		7.45	
21		43	16.1	2.8	1.5	2.171		3	100	0.03	21.0	0.1	1.0	0.0	7.15		7.07	
22		36	16.1	2.8	1.4	2.119		3	100	0.03	8.0	0.1	0.8	0.0	7.23		7.50	
23		36		3.3	1.4	1.954		3	60	0.03				0.0			7.46	
24		32	13.8	2.8	1.3	1.960		3	80	0.03	16.0	0.1	3.0	0.0	7.60		7.35	
25		39		2.9	1.3	1.935		3	100	0.03				0.0			7.38	
26		44		3.8	1.4	2.324		3	60	0.03				0.0			7.01	
27		53	15.3	2.8	1.5	2.136		3	60	0.03	9.0	0.1	1.0	0.0	7.29		7.51	
28		49	15.4	2.7	1.4	2.107		3	50	0.03	9.0	0.1	0.9	0.0	7.21		7.61	
29		51	15.3	3.1	1.5	2.164		3	90	0.03	10.0	0.1	0.5	0.0	7.30		7.56	
30		44	14.6	2.8	1.6	2.160		3	70	0.03	8.0	0.1	1.0	0.0	7.16		7.35	
TOTAL		1522	339.2	96.6	42.2	62.607		90	2490	0.90	211.0	2.5	37.6	0.0	151.08		221.5	
Average		50.733	16.152	3.2200	1.4067	2.08690		3	83.000	0.03	10.0476	0.12	1.79	0.0	7.1943		7.384	

Plant: Clinton WWTP

Month: 11/2000

	Aeration Tank								Sludge throughout the Plant								
date	final DO 19	30 min set test ml 20	MLSS 21	MLVS 22	RAS (GPM) 23	RSS (mg/l) 24	25	26	27	SCUM 28	pri. (mgd) 29	WAS (GPM) 30	31	sludge to dewater 32	Feed %TS 33	Fil %TS 34	Cake %TS 35	dewater hours 36
1		140	1775	1376	556	5100				300		49			2.47	.08	15.08	
2		145	1793	1391	554	5348				300		49						
3		140	1663	1283	554	5510				300		47						
4			1710		548	4436				300		46						
5			1764		549	3582				300		47						
6		140	1597	1244	536	5210				300		47						
7		135	1617	1237	538	4844				300		47						
8		140	1554	1204	538	4804				300		48			3.11	.07	16.74	
9		135	1565	1202	540	4798				300		48						
10		150	1645	1281	570	5180				300		48						
11			1716		586	4402				300		48						
12			1691		600	4258				300		48						
13		145	1581	1225	613	5130				300		48						
14		145	1690	1338	641	5452				300		47						
15		150	1624	1279	610	5470				300		47						
16		90	917	709	631	4346				300		45						
17		125	1335	1043	636	4154				300		45						
18			1882		638	5280				300		45						
19			1970		625	4826				300		46						
20		180	1971	1548	639	5830				300		47			3.17	.09	16.48	
21		185	2045	1615	617	5860				300		50						
22		185	1989	1569	613	5422				300		50						
23			1978		601	5286				300		50						
24		170	1701	1346	590	8252				300		50						
25			1833		577	6660				300		50						
26			1722		586	5988				300		49						
27		175	1844	1485	587	5480				300		49						
28		175	1866	1497	596	5808				300		49						
29		180	1845	1476	607	5432				300		49			3.23	.08	15.52	
30		185	1869	1489	620	5604				300		49						
Total		3215	51752	27837	17696	157752				9000		1437			11.98	0.32	64	
Average		153.10	1725	1326	590	5258				300		47.900			2.995	0.080	16.0	

Plant: Clinton WWTP

Month: 11/2000

	Process Control											Septage		Spec. Lab				
date	SRT days 37	Sludge level in 38	DO uptake mg/l 39	40	41	42	43	INF NH3-N mg/l 44	1EFF NH3-N mg/l 45	TEFF NH3-N mg/l 46	2EFF NH3-N mg/l 47	48	49	F. COLIFORM (#/100 ml) 50	51	52	Volatile acids 53	Alk 54
1		9	0.13											4	10	2		
2		7	0.13					16.6	15.6	13.0	0.33			0	0	3	88.89	3180
3		11	0.12											10	20	0		
4		12												0	10	3		
5		9						18.2	18.4	16.6	0.10			0	0	2		
6		11	0.11											0	1	2		
7		9	0.10					21.2	13.0	13.3	0.09			3	3	10	92.34	3380
8		10	0.11											0	0	0		
9		7	0.10											0	0	0	114.78	3215
10		11	0.13											0	5	4		
11		12												1	0	7		
12		9												0	1	4		
13		12	0.11											1	6	4		
14		12	0.12					16.5	10.4	11.8	0.07			7	9	10	40.56	3310
15		11	0.11											0	10	10		
16		8	0.06											20	52	13	40.56	3390
17		8	0.09											0	9	7		
18		12												1	3	7		
19		12												0	3	2		
20		12	0.10											1	17	8		
21		8	0.13					17.0	15.5	16.6	0.34			0	0	4	63.86	3400
22		12	0.11											0	3	6		
23		10												3	13	10		
24		11	0.08											0	0	10		
25		18												0	7	0		
26		14												0	0	0		
27		12	0.12											17	11	6		
28		11	0.13					27.2	29.3	13.2	0.24			5	10	7	64.73	3320
29		12	0.12											1	20	0		
30		12	0.11											0	5	10	90.62	3380
Total								116.7	102.2	84.5	1.17			74	228	151	596	26575
Average								19.45	17.03	14.08	0.20			2.47	7.60	5.03	74.54	3322

Plant: Clinton WWTP

Month: 11/2000

	Biochemical Oxygen demand (BOD5) mg/l							Suspended Solids (TSS) mg/l							Coliform (#/100ml)			DO
date	raw 55	pri. eff 56	% 57	sec. eff 58	% 59	final 60	% 61	raw 62	pri. eff 63	% 64	sec. eff	% 66	final 67	% 68	69	70	71	(mg/l) 72
1																		9
2	163	168	0	42.5	73.93	2.31	98.58	122	70	42.62			4.5	96.31				8.1
3																		8.4
4																		9
5	107	131	0	26	75.7	1.9	98.22	106	52	50.94			3	97.17				8.9
6																		9
7	190	171	10	38.1	79.95	2.6	98.63	138	54	60.87			3.5	97.46				8.5
8																		8.5
9	145	151	0	43.1	70.28	2.55	98.24	140	54	61.43			3	97.86				8.3
10																		9.2
11																		9
12	37	104	0	22.6	38.92	2.12	94.27	46	60	0			4.5	90.22				8.8
13																		8.5
14	156	145	7.05	138	11.54	3.08	98.02	108	46	57.41			3.5	96.76				8.6
15																		8.4
16	89.3	123	0	65.9	26.2	2.2	97.54	72	50	30.56			5	93.06				9.3
17																		9.3
18																		9.4
19	141	102	27.66	31.9	77.38	2.13	98.49	162	48	70.37			2.5	98.46				9.5
20																		9.5
21	159	152	4.4	34.7	78.18	3.43	97.84	144	48	66.67			1	99.31				8.9
22																		9.8
23	83.6	127	0	36.9	55.86	1.7	97.97	94	62	34.04			3	96.81				9.3
24																		10.1
25																		10
26	97.1	119	0	38.1	60.76	2.77	97.15	94	52	44.68			2.5	97.34				10.1
27																		9.7
28	172	145	15.7	46.6	72.91	1.91	98.89	204	58	71.57			3	98.53				9.6
29																		9.2
30	164	123	25	130	20.73	1.77	98.92	244	42	82.79			3	98.77				8.6
Total	1704	1761	90	694	742	30.5	1273	1674	696	674			42.0	1258				272.5
Average	131.1	135.5	6.91	53.4	57.10	2.344	97.90	128.8	53.54	51.84			3.231	96.77				9.1

73 Sample information: per permit BOD and TSS samples are _____ *composited over _____ **hours

74 Remember ALL VIOLATIONS of your permit or O&M regulations must be explained.

*Indicate whether flow, time or grab sample **Indicate whether 8, 16, or 24 hours.

ON THE BACK OF PAGE ONE EXPLAIN ANY VIOLATIONS OR OTHER SITUATIONS WHICH YOU FEEL WILL AID THIS OFFICE

Receiving Stream:

Plant: Clinton WWTP
Town or City: Clinton
Month: 12/2000
Chief Operator: J. Riccio
Assistant Chief Operator: R. Gorham

DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING
DIVISION OF WATER POLLUTION CONTROL
MONTHLY OPERATION AND MAINTENANCE REPORT

Region: New England
County: Worcester
If Contract Operation, Company _____ Chief Operator Centification of Report ___

Permit #: State M134 Fed. MA0100404

Plant Design Flow ____ mgd.
Monthly Average Flow ____ mgd.
Monthly Average Flow Last Year ____ mgd.

Date: February 23, 2001

COMPLETE STAFFING PLAN MUST BE SUBMITTED IN JUNE AND JANUARY OF EACH YEAR, OR WHEN ANY PERSONNEL CHANGES OCCUR

This Plant was in Complete Permit Compliance this Month. YES NO

	Weather			Sewage Flows (mgd)				Grit	Disinfection		Settleable Solids				pH			
Date	rain 1	temp 2	inf temp 3	max 4	min 5	total 6	bypass 7	cu.ft. 8	GPD 9	CL2 RESID < 10	raw 11	pri. eff 12	sec. eff 13	final 14	Influent		Effluent	
															Hi	Low	Hi	Low
1		43	15.1	2.8	1.5	2.106		3	100	0.03	10.0	0.1	0.8	0.00	7.47		6.96	
2		33		3.2	1.4	2.082		3	100	0.03				0.00			6.92	
3		44		3.3	1.4	2.106		3	100	0.03				0.00			7.50	
4		53	13.0	2.8	1.4	2.061		3	100	0.03	14.0	0.1	0.9	0.10	7.37		7.61	
5		48	15.0	2.8	1.4	2.099		3	80	0.03	11.0	0.1	1.0	0.00	7.12		7.74	
6		34	13.8	3.1	1.4	2.043		3	80	0.03	10.0	0.1	1.0	0.00	7.19		7.63	
7		33	17.1	2.8	1.3	2.026		3	90	0.03	10.0	0.4	0.8	0.00	7.28		7.41	
8		20	14.3	2.8	1.4	2.041		3	80	0.03	10.0	0.1	0.5	0.00	6.95		7.34	
9		31		3.3	1.3	2.037		3	50	0.03				0.00			7.36	
10		41		3.0	1.4	2.070		3	50	0.03				0.00			7.34	
11		50	14.4	2.6	1.4	2.068		3	60	0.03	10.0	0.1	0.4	0.00	7.31		7.31	
12		54	15.5	2.8	1.3	2.054		3	70	0.03	10.0	0.0	0.4	0.00	6.99		7.32	
13		38	14.9	2.7	1.4	1.979		3	80	0.03	10.0	0.1	0.5	0.00	7.22		6.73	
14		35	13.8	3.0	1.4	2.057		3	80	0.03	10.0	0.3	1.0	0.00	7.21		6.87	
15		40	15.9	2.6	1.3	1.966		3	80	0.03	12.0	0.0	0.8	0.00	7.37		7.27	
16		38		3.0	1.4	2.111		3	50	0.03				0.00			6.86	
17		64		5.4	2.2	3.321		3	80	0.03				0.00			7.17	
18		40	11.9	3.9	2.0	2.918		3	90	0.03	6.0	0.1	2.5	0.00	7.20		6.86	
19		40	14.2	3.7	2.1	2.769		3	90	0.03	5.0	0.1	0.6	0.00	7.12		7.36	
20		34	13.6	3.4	2.0	2.697		3	80	0.03	10.0	0.1	0.1	0.00	7.15		7.38	
21		38	16.5	3.6	2.0	2.566		3	80	0.03	10.0	0.1	0.5	0.00	7.19		7.43	
22		37	12.7	3.4	1.8	2.509		3	80	0.03	10.0	0.1	0.5	0.00	7.11		7.52	
23		29		3.8	1.8	2.481		3	90	0.03				0.00			7.44	
24		33		3.6	1.7	2.411		3	80	0.03				0.00			7.27	
25		20		3.4	1.7	2.213		3	80	0.03				0.00			7.28	
26		28	12.4	3.5	1.6	2.334		3	100	0.03	7.0	0.1	1.5	0.00	7.29		7.23	
27		34	10.6	3.3	1.6	2.296		3	150	0.03	10.0	0.1	1.7	0.00	7.60		7.35	
28		22	10.5	3.4	1.6	2.202		3	60	0.03	10.0	0.2	0.8	0.00	7.35		7.32	
29		42	12.4	2.9	1.4	2.133		3	90	0.03	10.0	0.1	0.5	0.00	7.27		7.29	
30		28		2.9	1.5	2.161		3	90	0.03				0.00			7.21	
31		29		3.3	1.4	2.116		3	90	0.03				0.00			7.11	
TOTAL	12.3	1153	277.6	100.1	48.5	70.033		93	2580	0.93	195.0	2.2	16.6	0.10	144.76		225.4	
Average		37.194	13.880	3.2290	1.5645	2.25913		3	83.226	0.03	9.7500	0.11	0.83	0.00	7.2380		7.271	

Plant: Clinton WWTP

Month: 12/2000

	Aeration Tank								Sludge throughout the Plant									
date	final DO	30 min set test ml	MLSS	MLVS	RAS (GPM)	RSS (mg/l)				SCUM	pri. (mgd)	WAS (GPM)		sludge to dewater	Feed %TS	Fil %TS	Cake %TS	dewater hours
	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
1		180	1872	1488	608	4952				300		49						
2			1836		605	5026				300		49						
3			1808		605	6094				300		49						
4		185	1761	1415	599	5242				300		49						
5		190	1825	1472	595	5762				300		49						
6		190	1920	1555	592	5568				300		49						
7		180	1814	1456	589	5894				300		49						
8		185	1890	1530	585	5696				300		49						
9			1865		583	5784				300		49						
10			1977		582	7472				300		49						
11		190	1925	1571	583	6170				300		49						
12		190	1980	1622	585	5464				300		49						
13		205	1951	1607	581	5322				300		49						
14		200	1946	1595	582	5580				300		49						
15		210	1971	1611	576	5706				300		49						
16			1968		579	5630				300		49						
17			1995		651	5846				300		48						
18		215	1874	1560	704	6344				300		48						
19		210	1916	1586	745	5890				300		49						
20		205	2004	1652	787	6390				300		50						
21		210	2032	1670	813	5854				300		50						
22		220	2154	1778	766	5908				300		49						
23			2236		742	6074				300		49						
24			2158		721	6848				300		49						
25			2071		694	6364				300		49						
26		230	1999	1654	680	5890				300		46						
27		220	1959	1643	668	5546				300		47			3.48	.06	15.2	
28		215	1932	1612	652	5554				300		48						
29		225	1990	1680	636	6232				300		47						
30			2129		633	6694				300		47						
31			2122		621	6892				300		51						
Total		4055	60880	31757	19942	183688				9300		1511			3.48	0.06	15	
Average		202.75	1964	1588	643	5925				300		48.742			3.480	0.060	15.2	

Plant: Clinton WWTP

Month: 12/2000

	Process Control											Septage		Spec. Lab				
date	SRT days 37	Sludge level in 38	DO uptake mg/l 39	40	41	42	43	INF NH3-N mg/l 44	1EFF NH3-N mg/l 45	TEFF NH3-N mg/l 46	2EFF NH3-N mg/l 47	48	49	F. COLIFORM (#/100 ml) 50	51	52	Volatile acids 53	Alk 54
1		10	0.11											3	3	0		
2		10												0	0	0		
3		12												0	1	3		
4		14	0.10											0	6	10		
5		12	0.12					16.4	16.1	14.5	0.12			3	10	10	54.37	3370
6		12	0.13											3	4	3		
7		10	0.11											0	3	20	91.48	3495
8		12	0.13											0	7	4		
9		12												0	0	0		
10		12												0	20	10		
11		14	0.16											1	10	3		
12		14	0.17					18.8	17.0	18.0	0.12			0	7	2	119.09	3460
13		12	0.14											0	0	0		
14		14	0.13											2	4	3	106.15	3520
15		13	0.15											3	0	10		
16		12												0	0	0		
17		12												0	3	0		
18		20	0.14											0	4	10		
19		22	0.13					14.9	14.0	13.6	0.09			7	20	10	115.64	3530
20		22	0.14											5	10	7		
21		21	0.13											10	10	11	100.97	3610
22		21	0.15											4	0	10		
23		15												0	2	3		
24		16												3	3	0		
25		14												0	1	4		
26		14	0.14					19.7	21.3	14.2	1.54			0	10	1	132.04	3620
27		14	0.20											3	3	0		
28		14	0.31											1	0	0	144.12	3695
29		12	0.14											0	3	1		
30		12												0	0	0		
31		11												0	1	0		
Total								69.8	68.4	60.3	1.87			48	145	135	864	28300
Average								17.45	17.10	15.08	0.47			1.55	4.68	4.35	107.98	3538

Plant: Clinton WWTP

Month: 12/2000

	Biochemical Oxygen demand (BOD5) mg/l							Suspended Solids (TSS) mg/l							Coliform (#/100ml)			DO
date	raw 55	pri. eff 56	% 57	sec. eff 58	% 59	final 60	% 61	raw 62	pri. eff 63	% 64	sec. eff	% 66	final 67	% 68	69	70	71	(mg/l) 72
1																		9.2
2																		9
3	104	119	0	35.6	65.77	1.9	98.17	98	54	44.9			2	97.96				10.2
4																		10.1
5	235	194	17.45	56.9	75.79	1.92	99.18	144	56	61.11			3.5	97.57				10.2
6																		10
7	223	211	5.38	63.6	71.48	2.09	99.06	172	50	70.93			2.5	98.55				9.6
8																		9.6
9																		9.8
10	97.8	112	0	49.7	49.18	2.37	97.58	78	52	33.33			4	94.87				10
11																		9.5
12	138	138	0	54.7	60.36	1.81	98.69	148	60	59.46			2.5	98.31				8.8
13																		8.8
14	203	165	18.72	63.5	68.72	2.52	98.76	132	66	50			2.5	98.11				9.3
15																		9
16																		9.2
17	100	105	0	63.6	36.4	4.1	95.9	128	70	45.31			2.5	98.05				9
18																		9.6
19	104	133	0	60.9	41.44	2.1	97.98	60	50	16.67			.5	99.17				9.4
20																		9
21	172	198	0	69.1	59.82	1.6	99.07	120	52	56.67			2	98.33				9.1
22																		10
23																		10.2
24	102	121	0	50.9	50.1	1.94	98.1	82	48	41.46			1.5	98.17				9.9
25																		10
26	179	275	0	171	4.47	10.9	93.91	130	68	47.69			11.3	91.31				9.7
27																		9.6
28	112	114	0	56.8	49.28	2.86	97.45	90	54	40			.5	99.44				8.7
29																		9.8
30																		9.9
31	98.8	100	0	54.9	44.43	2.35	97.62	102	44	56.86			1.5	98.53				9.4
Total	1869	1985	42	851	677	38.5	1271	1484	724	624			36.8	1268				295.6
Average	143.7	152.7	3.20	65.5	52.10	2.958	97.81	114.2	55.69	48.03			2.831	97.57				9.5

73 Sample information: per permit BOD and TSS samples are _____ *composited over _____ **hours

74 Remember ALL VIOLATIONS of your permit or O&M regulations must be explained.

*Indicate whether flow, time or grab sample **Indicate whether 8, 16, or 24 hours.

ON THE BACK OF PAGE ONE EXPLAIN ANY VIOLATIONS OR OTHER SITUATIONS WHICH YOU FEEL WILL AID THIS OFFICE

Receiving Stream:

Plant: Clinton WWTP
Town or City: Clinton
Month: 01/2001
Chief Operator: J. Riccio
Assistant Chief Operator: R. Gorham

DEPARTMENT OF ENVIRONMENTAL QUALITY ENGINEERING
DIVISION OF WATER POLLUTION CONTROL
MONTHLY OPERATION AND MAINTENANCE REPORT

Region: New England
County: Worcester
If Contract Operation, Company _____ Chief Operator Centification of Report ___

Permit #: State M134 Fed. MA0100404

Plant Design Flow ____ mgd.
Monthly Average Flow ____ mgd.
Monthly Average Flow Last Year ____ mgd.

Date: February 23, 2001

COMPLETE STAFFING PLAN MUST BE SUBMITTED IN JUNE AND JANUARY OF EACH YEAR, OR WHEN ANY PERSONNEL CHANGES OCCUR

This Plant was in Complete Permit Compliance this Month. YES NO

	Weather			Sewage Flows (mgd)				Grit	Disinfection		Settleable Solids				pH			
Date	rain 1	temp 2	inf temp 3	max 4	min 5	total 6	bypass 7	cu.ft. 8	GPD 9	CL2 RESID < 10	raw 11	pri. eff 12	sec. eff 13	final 14	Influent		Effluent	
															Hi	Low	Hi	Low
1		36		3.0	1.4	2.039		3	80	0.03				0.0			7.21	
2		31	10.3	2.7	1.3	2.099		3	90	0.03	7.5	0.1	0.3	0.0	7.28		7.34	
3		38	12.4	2.7	1.5	2.081		3	90	0.03	8.0	0.0	0.8	0.0	7.31		7.37	
4		34	10.4	2.7	1.4	2.111		3	60	0.03	7.0	0.0	1.0	0.0	7.23		7.32	
5		36	10.4	2.7	1.4	2.046		3	80	0.03	10.0	0.1	0.8	0.0	7.25		7.34	
6		39		2.9	1.3	2.035		3	90	0.03				0.0			7.12	
7		41		3.0	1.3	2.043		3	70	0.03				0.0			7.31	
8		39	12.0	2.8	1.4	2.069		3	70	0.03	13.0	0.1	1.9	0.0	7.56		7.09	
9		32	12.0	2.6	1.3	2.006		3	100	0.03	11.0	0.1	0.9	0.0	7.16		7.15	
10		30	11.3	2.6	1.4	1.996		3	80	0.03	15.0	0.1	0.3	0.0	7.29		7.45	
11		42	12.8	2.7	1.4	2.008		3	80	0.03	16.0	0.3	0.5	0.0	7.44		7.52	
12		37	11.3	2.7	1.3	1.967		3	80	0.03	8.0	0.0	0.8	0.0	7.00		7.41	
13		39		3.0	1.3	1.959		3	70	0.03				0.0			7.39	
14		45		2.9	1.4	1.954		3	60	0.03				0.0			7.36	
15		34		3.3	1.3	2.084		3	60	0.03				0.0			7.13	
16		44	11.1	2.7	1.3	2.019		3	60	0.03	7.0	0.1	0.8	0.0	7.28		6.82	
17		42	11.0	2.8	1.3	2.009		3	60	0.03	8.0	0.1	1.0	0.0	7.42		6.50	
18		32	10.4	2.7	1.3	1.985		3	60	0.03	7.0	0.1	1.5	0.0	7.13		6.94	
19		36	10.9	2.6	1.3	1.995		3	50	0.03	10.0	0.0	1.3	0.0	7.13		7.29	
20		36		2.9	1.3	1.966		3	50	0.03				0.0			7.35	
21		29		3.2	1.2	1.984		3	50	0.03				0.0			7.31	
22		36	13.1	3.5	1.3	1.962		3	50	0.03	12.0	0.1	0.6	0.0	7.49		7.20	
23		38	11.2	2.6	1.3	1.983		3	40	0.03	12.0	0.1	0.7	0.0	7.21		6.88	
24		44	10.9	2.8	1.3	2.002		3	40	0.03	11.0	0.0	0.8	0.0	7.23		7.16	
25		45	10.3	2.7	1.3	1.963		3	50	0.03	9.0	0.0	1.0	0.0	7.22		7.13	
26		42	12.0	2.7	1.4	1.957		3	50	0.03	11.0	0.1	1.0	0.0	7.14		7.20	
27		39		3.0	1.2	1.916		3	50	0.03				0.0			7.15	
28		38		3.0	1.2	1.966		3	40	0.03				0.0			7.39	
29		41	12.9	2.6	1.3	1.950		3	40	0.03	17.0	0.1	1.2	0.0	7.58		7.24	
30		41	11.5	2.6	1.2	2.111		3	50	0.03	15.0	0.1	1.0	0.0	7.14		7.22	
31		46	12.5	2.8	1.4	2.120		3	70	0.03	11.0	0.1	1.3	0.0	7.38		7.32	
TOTAL	12.3	1182	240.7	87.5	41.0	62.385		93	1970	0.93	225.5	1.3	19.2	0.0	152.87		223.6	
Average		38.129	11.462	2.8226	1.3226	2.01242		3	63.548	0.03	10.7381	0.06	0.91	0.0	7.2795		7.213	

Plant: Clinton WWTP

Month: 01/2001

	Aeration Tank								Sludge throughout the Plant									
date	final DO	30 min set test ml	MLSS	MLVS	RAS (GPM)	RSS (mg/l)	25	26	27	SCUM	pri. (mgd)	WAS (GPM)	31	sludge to dewater	Feed %TS	Fil %TS	Cake %TS	dewater hours
	19	20	21	22	23	24				28	29	30		32	33	34	35	36
1			2123		606	7044				300		51						
2		240	2115	1783	601	6146				300		51						
3		250	2187	1833	598	6674				300		51						
4		245	2193	1854	595	6400				300		51						
5		235	2274	1915	591	6636				300		50						
6			2271		591	7712				300		50						
7			2265		588	8046				300		50						
8		260	2275	1928	587	7006				300		50			3.41	.07	16.01	
9		245	2376	1997.6	581	6766				300		51						
10		250	2287	1923	578	6880				300		51						
11		250	2389	2016	576	7282				300		51						
12		240	2354	1972	572	7494				300		51						
13			2420		566	10046				300		51						
14			2351		563	7876				300		51						
15			2390		568	9022				300		51						
16		275	2562	2167	568	5910				300		51						
17		270	2559	2175	571	6190				300		51			3.46	.08	16.09	
18		260	2450	2067	572	6532				300		51						
19		250	2423	2056	574	5708				300		51						
20			2457		568	5208				300		51						
21			2257		566	4824				300		51						
22		230	2142	1834	563	5146				300		51						
23		205	1973	1698	563	5954				300		50						
24		205	1767	1524	564	6118				300		49			3.59	.08	15.56	
25		235	2264	1921	563	5746				300		49						
26		240	2303	1969	562	5988				300		49						
27			1944		559	5872				300		49						
28			2535		558	4590				300		49						
29		215	2076	1785	555	8982				300		51						
30		235	2268	1953	564	6114				300		50						
31		240	2358	2011	573	5944				300		50			3.45	.09	14.78	
Total		5075	70608	40382	17804	205856				9300		1564			13.91	0.32	62	
Average		241.67	2278	1923	574	6641				300		50.452			3.478	0.080	15.6	

Plant: Clinton WWTP

Month: 01/2001

	Process Control											Septage		Spec. Lab				
date	SRT days 37	Sludge level in 38	DO uptake mg/l 39	40	41	42	43	INF NH3-N mg/l 44	1EFF NH3-N mg/l 45	TEFF NH3-N mg/l 46	2EFF NH3-N mg/l 47	48	49	F. COLIFORM (#/100 ml) 50	51	52	Volatile acids 53	Alk 54
1		7												0	1	0		
2		11	0.15					21.8	16.4	17.4	0.07			2	10	3	126	3690
3		11	0.16											0	4	0		
4		16	0.19											0	5	3	119.09	3670
5		18	0.15											0	1	5		
6		12												0	0	3		
7		15												0	1	0		
8		15	0.17											0	3	3		
9		20	0.23					28.6	22.4	17.0	1.71			3	0	2	110.46	3610
10		19	0.16											0	0	4		
11		21	0.17											0	3	0	50.92	3660
12		15	0.17											0	2	1		
13		10												1	0	4		
14		15												0	10	7		
15		18												0	10	1		
16		24	0.25					21.5	18.4	20.3	1.60			0	0	0	101.83	3820
17		24	0.20											1	0	3		
18		22	0.19											1	1	0	106.15	3840
19		22	0.20											0	2	2		
20		20												0	0	4		
21		17												0	0	3		
22		14	0.17											0	1	1		
23		15	0.22					19.6	24.5	17.6	0.84			0	2	0	88.89	3900
24		14	0.31											0	0	3		
25		15	0.35											0	1	0	130.74	4050
26		15	0.17											0	0	2		
27		15												0	0	0		
28		17												1	1	2		
29		19	0.19											0	1	0		
30		15	0.17					14.6	18.0	15.2	0.13			0	1	7	90.62	3990
31		22	0.20											1	7	0		
Total								106.1	99.7	87.5	4.35			10	67	63	925	34230
Average								21.22	19.94	17.50	0.87			0.32	2.16	2.03	102.74	3803

Plant: Clinton WWTP

Month: 01/2001

	Biochemical Oxygen demand (BOD5) mg/l							Suspended Solids (TSS) mg/l							Coliform (#/100ml)			DO
date	raw 55	pri. eff 56	% 57	sec. eff 58	% 59	final 60	% 61	raw 62	pri. eff 63	% 64	sec. eff	% 66	final 67	% 68	69	70	71	(mg/l) 72
1																		10
2	155	110	29.03	62.2	59.87	2.01	98.7	160	52	67.5			1.5	99.06				10.2
3																		9.5
4	128	127	.78	70.8	44.69	2.02	98.42	138	54	60.87			2.5	98.19				9.4
5																		9.5
6																		9.6
7	83.7	104	0	159	0	1.63	98.05	96	56	41.67			2.5	97.4				9.5
8																		9.7
9	142	149	0	72.3	49.08	1.68	98.82	124	52	58.06			2	98.39				9.5
10																		10.4
11	187	228	0	87.5	53.21	1.98	98.94	130	54	58.46			2	98.46				10.3
12																		10
13																		10.2
14	76.9	334	0	78.1	0	2.1	97.27	78	42	46.15			2	97.44				9.7
15																		9.8
16	206	170	17.48	79.2	61.55	1.63	99.21	200	38	81			2	99				9.1
17																		9.6
18	294	257	12.58	130	55.78	2.19	99.26	102	54	47.06			2	98.04				9
19																		9.2
20																		9.7
21	119	109	8.4	58.6	50.76	2.04	98.28	84	40	52.38			2.5	97.02				9.7
22																		10.3
23	184	251	0	152	17.39	2.5	98.64	104	62	40.38			2.5	97.6				10.2
24																		8.8
25	188	175	6.91	104	44.68	2.65	98.59	114	48	57.89			2.5	97.81				9.2
26																		9.3
27																		9.2
28	114	119	0	69.4	39.12	3.08	97.3	100	54	46			3	97				9.8
29																		10.1
30	330	209	36.67	113	65.76	2.61	99.21	82	60	26.83			3	96.34				9.9
31																		9.1
Total	2208	2342	112	1236	542	28.1	1281	1512	666	684			30.0	1272				299.5
Average	169.8	180.2	8.60	95.1	41.68	2.163	98.51	116.3	51.23	52.63			2.308	97.83				9.7

73 Sample information: per permit BOD and TSS samples are _____ *composited over _____ **hours

74 Remember ALL VIOLATIONS of your permit or O&M regulations must be explained.

*Indicate whether flow, time or grab sample

**Indicate whether 8, 16, or 24 hours.

ON THE BACK OF PAGE ONE EXPLAIN ANY VIOLATIONS OR OTHER SITUATIONS WHICH YOU FEEL WILL AID THIS OFFICE

Appendix C: Special Study, January 10-16, 2001

Hourly Dosage Rate of Sodium Hypochlorite (January 10-16, 2001)

Time	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	23:59
1/10	2	1.8	1.7	1.7	1.7	1.7	2.1	3.2	3.2	3.2	3.2	3.2	3.2	2.9	2.9	2.9	3	3.2	3.2	3.2	3.2	3.2	3.2	2.1
1/11	2	1.8	1.7	1.7	1.7	1.7	2.1	2.1	3.2	3.2	3.2	3.2	3.8	3.9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	2.1
1/12	2	1.8	1.7	1.7	1.7	1.7	1.7	1.8	2.8	3.2	3.2	4	4	3.9	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3.2	3	2.1
1/13	2	1.8	1.8	1.7	1.7	1.7	1.7	2	2.9	3.2	3.3	4	4	3.9	3.2	3.2	3.2	3.2	3.2	2.9	2.9	3	2.1	2.1
1/14	2	1.8	1.7	1.7	1.7	1.7	2	3.2	3.2	3.2	3.2	3.2	3	2.9	2.9	2.9	2.9	3.2	3.2	2.9	2.9	3	2.2	2.1
1/15	1.7	1.8	1.7	1.7	1.7	1.7	2	3.2	3.2	3.2	3.2	3	3	3	2.9	2.9	2.9	3.2	3.2	3.2	3.2	3.2	3.2	3.2
1/16	2	1.8	1.7	1.7	1.7	1.8	2.1	3.2	3.2	3.2	3.2	3.2	3	2.9	2.9	2.9	2.9	3.2	3.2	3.2	3.2	3.2	3.2	2.2
Max	**2.00**	**1.80**	**1.80**	**1.70**	**1.70**	**1.80**	**2.10**	**3.20**	**3.20**	**3.20**	**3.30**	**4.00**	**4.00**	**3.90**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**	**3.20**
Min	**1.70**	**1.80**	**1.70**	**1.70**	**1.70**	**1.70**	**1.70**	**1.80**	**2.80**	**3.20**	**3.20**	**3.00**	**3.00**	**2.90**	**2.90**	**2.90**	**2.90**	**3.20**	**3.20**	**2.90**	**2.90**	**3.00**	**2.10**	**2.10**
Average	**1.96**	**1.80**	**1.71**	**1.70**	**1.71**	**1.71**	**1.96**	**2.67**	**3.10**	**3.20**	**3.21**	**3.40**	**3.43**	**3.34**	**3.03**	**3.03**	**3.04**	**3.20**	**3.20**	**3.11**	**3.11**	**3.14**	**2.87**	**2.27**

Hourly Flow Rate (January 10 -16, 2001)

DATE	1:00	2:00	3:00	4:00	5:00	6:00	7:00	8:00	9:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	23:59
1/10	1.8	1.6	1.4	1.4	1.4	1.5	2	2.6	2.6	2.6	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.4	2.5	2.6	2.6	2.5	2.4	2
1/11	1.8	1.6	1.4	1.4	1.4	1.4	1.8	2.4	2.6	2.6	2.6	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.5	2.4	2
1/12	1.8	1.6	1.4	1.4	1.4	1.4	2	2.5	2.6	2.6	2.6	2.5	2.4	2.3	2.3	2.3	2.2	2.4	2.4	2.4	2.4	2.2	2.2	2
1/13	1.8	1.6	1.6	1.4	1.4	1.3	1.4	1.7	2.2	2.6	2.8	3	2.9	2.8	2.6	2.5	2.5	2.4	2.4	2.3	2.2	2.2	2	2
1/14	1.8	1.6	1.4	1.4	1.4	1.4	1.4	1.5	2.1	2.5	2.7	2.9	2.9	2.8	2.6	2.6	2.5	2.4	2.4	2.4	2.4	2.2	2.1	2
1/15	1.4	1.6	1.4	1.4	1.4	1.4	2	2	2.4	2.4	2.4	2.5	2.7	2.8	2.6	2.5	2.6	2.6	2.6	2.6	2.6	2.6	2.5	2.8
1/16	1.8	1.6	1.4	1.4	1.3	1.4	2	2.6	2.6	2.6	2.5	2.4	2.4	2.3	2.3	2.3	2.4	2.4	2.5	2.6	2.6	2.6	2.4	2.2
Max	**1.8**	**1.6**	**1.6**	**1.4**	**1.4**	**1.5**	**2**	**2.6**	**2.6**	**2.6**	**2.8**	**3**	**2.9**	**2.8**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.6**	**2.5**	**2.8**
Min	**1.4**	**1.6**	**1.4**	**1.4**	**1.3**	**1.3**	**1.4**	**1.5**	**2.1**	**2.4**	**2.4**	**2.4**	**2.4**	**2.3**	**2.3**	**2.3**	**2.2**	**2.4**	**2.4**	**2.3**	**2.2**	**2.2**	**2**	**2**
Average	**1.743**	**1.6**	**1.429**	**1.4**	**1.386**	**1.4**	**1.8**	**2.186**	**2.443**	**2.557**	**2.6**	**2.6**	**2.586**	**2.529**	**2.429**	**2.4**	**2.386**	**2.429**	**2.457**	**2.486**	**2.486**	**2.4**	**2.286**	**2.143**