

2010 Periodic Biosolids Program Performance Report

Issued: March 2011

Introduction

The Grand Rapids Wastewater Treatment Plant (GRWWTP), located in Grand Rapids, MI, provides wastewater collection and treatment for the City of Grand Rapids and 9 surrounding communities totaling approximately 270,000 customers within a 200 square mile geographical area. The wastewater plant has a design capacity of 61 MGD and currently has an average daily flow of 46 MGD. The facility was constructed in the 1920's and treatment consisted of primary clarification, anaerobic digestion, and drying beds. The Biosolids from the drying beds was bagged and sold to businesses and homeowners for fertilizer for many years. In the mid 1950's the plant was expanded to include secondary treatment capability utilizing activated sludge as the biological treatment process along with increased primary treatment capacity and disinfection. In the 1970's the facility was again expanded to increase flow capacity and solids handling processes. Solids handling converted from anaerobic digestion to thermal heat treatment using low pressure oxidation.



The GRWWTP was part of a third round of agencies participating in the National Biosolids Partnership (NBP) Environmental Management System (EMS) for Biosolids. Development of our EMS program started in early 2005 with the creation of an internal EMS team. Team members attended four (4) NBP sponsored workshops which helped guide the development of our EMS. The GRWWTP Biosolids EMS was formally certified by the NBP in December 2006 and successfully completed our first annual interim audit in November 2007. During 2008 an internal audit was performed. In October of 2009 we successfully completed our second interim audit. We completed an internal audit during the first quarter of 2010 and are in the process of conducting another internal audit. We have contacted the National Biosolids Partnership regarding the scheduling of our third interim audit later this year.

During July of 2009, the Joint Biosolids Management Project Agreement was approved by the City of Grand Rapids and City of Wyoming which finalized the creation of the Grand Valley Regional Biosolids Authority (GVRBA). On July 1, 2009 the GVRBA became responsible for processing 100% of the Biosolids from the City of Grand Rapids, Wastewater Plant and the City of Wyoming, Clean Water Plant.

In 2010, several modifications and improvements were completed and/or undertaken at the WWTP and the collection system support facilities including:

- the addition of a fourth final effluent screw pump.
- new motors and gearboxes for the three (3) existing final effluent screw pumps
- upgraded and made improvements to several buildings and roads within the plant grounds.
- modifications to the Primary Effluent Retention Basin (PERB) so that it could be utilized as an equalization basin.
- new dewatering wells in the south and north secondary area.
- Bird Lift Station and emergency generator replacement.
- Replacement of the Market Avenue Pump Station (MAPS) emergency generator.
- Upgrades and replacement of electrical apparatus MAPS.
- North secondary treatment improvements.
- Replacement of the Guild Lift Station.
- New emergency generators at Collingdale, Meadowood Trails, Michigan Street and Oak Hollow lift stations.
- Installation of a septage waste receiving station.
- Demolition and removal of the Zimpro® sludge processing facilities (including the (2) two associated sludge storage tanks.
- Removal of the reaeration blowers (3).
- Demolition and removal of V and VI digesters and control rooms.

Outcomes Matter

The NBP has identified key outcomes which serve as good indicators of successful and well managed Biosolids management practices. Efforts undertaken by GRWWTP during the past year in support of these outcomes are detailed below.

Quality Management Practices

- Evaluated the use of solar panels for improving reliability and saving labor associated with monitoring the collection system
- Reorganized department to have the Utility Maintenance Mechanics, Maintenance Painter, Utility Crew Leader and the Plant Assistants report to the Utility Supervisors, Operations (Operations/Maintenance Group).
- Improved public participation by promoting an opportunity for all tour group coordinators to submit a survey that will provide feedback regarding their knowledge of our biosolids EMS.
- Provide exemplary facility maintenance by monitoring corrective work effort to preventive work effort. A high ratio (>75%) of preventative work to corrective work for each of the three skilled trades (Maintenance, Electricians and Instrument Technicians) is a good indicator that the facility operates in a proactive continual improvement mode.
- Reduce grit blower usage and implement air flow control for grit handling. Determine if unit upgrades will provide cost savings or performance improvements.
- Re-evaluate the use of the WAS thickening centrifuges. Determine if energy, cost or labor savings can be achieved without compromising the performance of downstream unit processes.

- Tracked monthly averages for CBOD, TSS, NH3 and PO4 in the north plant in an effort to improve BOD removal, nitrification/identification and phosphorus removal in this area of the plant.
- Sewer Assessment project which provides for structured system analysis, condition assessment, addition of data missing from GIS, correction of erroneous data, and an objective risk assessment of the collection system. This risk assessment will identify areas where the collection system is vulnerable to failure and will determine the effect and relative severity of any failure's impact on collection system operations, equipment, and the health and safety of the public.
- Provide commendable customer service by maintaining a 92% satisfaction rating among those citizens we have serviced by surveying customers that have reported possible issues with the collection system.
- Continued to monitor work orders and the related time spent on them and increased the baseline to 120 hours each month per each maintenance staff employee (Utility Maintenance Mechanics, Maintenance Painter, Utility Crew Leader and the Plant Assistants) and 100 hours for each operations staff employee (Operator I and Operator II).
- Clean all sanitary sewer15" and smaller once every five years.

Relations with Interested Parties

In 2010, we focused on the many educational opportunities that were afforded to us in the Grand Rapids metropolitan area. In most cases, the costs for participation were limited to printing costs for educational materials that we passed out to interested parties.

- During March, several staff members volunteered at an informational booth at the "Home Expo" – attendance 25, 000. This event was held at the DeVos Center in downtown Grand Rapids. Staff from a variety of workgroups volunteered for this event.
- In celebration of Earth Day, 2010 staff manned an informational booth at the "Party for the Planet" which was held at John Ball Zoo in Grand Rapids. Approximately 6,000 people attended the party.
- Over 100 groups were toured the Wastewater Treatment Facility in 2010.
- Based on enthusiastic input from staff, display materials have been ordered in order to be able to present more information in the limited amount of space that is usually allotted for "not-for-profit" entities at expositions.
- Distributed three (3) "Environmental Tips" to all sewer customers.

Regulatory Compliance

- Completed modifications to the Primary Effluent Retention Basin for utilization as a flow equalization basin.
- Completed the installation of an additional final effluent screw pump to lift effluent out of the plant during elevated river levels.
- Achieved 100% compliance with regulatory requirements as related to Biosolids.
- Submitted application for our new NPDES permit.

Environmental Performance

- Maintaining effective maintenance management programs (Maximo® and Cityworks®) in the Environmental Services Department helps ensure reliable equipment and operations and helps to prevent accidental spills, combined sewer overflows and sanitary sewer overflows.
- A motivated staff striving to achieve 100% compliance with all regulatory requirements is focused on protecting the environment. The Environmental Services Department - Grand Rapids staff operates in a highly effective and professional manner and consistently achieves regulatory compliance in excess of 99.9%.
- In 2010, installation and testing of bar screens with 2 mil perforations in the headworks area of the plant. This reduced spacing is currently under evaluation for utilization at the Market Avenue Retention Basin.
- In 2005, the City (including the Wastewater Plant) formed a “Renewable Energy Team” that began meeting with various community partners, companies, and energy experts in search of the best way to fulfill the 20% renewable energy goal set by Mayor George Heartwell. The City Commission approved a purchase that met the 20% goal in November, 2007. This purchase continues to significantly reduce Grand Rapids’ carbon footprint by offsetting the greenhouse gasses (carbon dioxide, sulfur dioxide and nitrogen oxide) produced using non-renewable sources and qualifies the City for this recognition by the EPA.
- Over the last 18 years the City of Grand Rapids has worked aggressively to reduce Combined Sewer Overflow volumes by 99.9% and is continuing work to remove the remaining 0.1%.
- In 2010 a compressed air leak detection survey was performed to pinpoint and then repair costly leaks in the compressed air system. After repairing all leaks in the compressed air system, we performed a compressed air use survey so that we could accurately gauge how much compressed air we actually use and what are future needs might be.
- In 2010 we began a project to replace our oversized compressed air system with a “right-sized” system. Development of this project (which has a two year pay-off) was done completely “in house” in lieu of utilizing a consulting engineer. Projected cost savings are \$30,000 annually in electric costs alone.

Biosolids Value Chain - Monitoring and Measurement Report and Progress

Monitoring and measurement provides critical input to the organization relative to the effectiveness of its operational controls. This information helps to identify any weaknesses or other areas in which the program can be improved.

Wastewater Collection and Pretreatment

Significant industrial users – In 2010, IPP staff worked with industrial users and State regulators to maintain compliance with local, state, and federal discharge laws. Annually, IPP provides an industrial user meeting to keep industries current on regulations, understanding the IPP program, and compliance issues. A Linko® compliance database is utilized to track compliance while email and phone reminder notifications are sent to industrial users for sampling and reporting events.

Commercial user discharges – IPP staff is reviewing non-domestic user surveys distributed in April 2010. 2000 surveys were mailed as part of a federal requirement for IPP programs. Users who might fit the criteria of a Significant Industrial user are notified with further information collected by phone or a site visit to determine if the user requires an industrial user permit.

Discharge authorizations – Discharge requests that are one time or short term discharges to the POTW are handled using this process. A discharge request containing MSDS sheets, waste characterization, flow volumes, discharge rates and location is submitted by potential dischargers. The proposed discharge is reviewed by IPP staff to determine potential impacts to the POTW. The user receives an approval or denial letter for the discharge.

Pollutant minimization – Toxic metals, including mercury, are the main focus for pollutant minimization for IPP staff. Toxic metals are tracked by collecting and analyzing six trunkline locations daily, while mercury is analyzed monthly from each of the six locations. POTW influent mercury is sampled and analyzed monthly, with low level influent and final effluent sampling performed quarterly.

Wastewater Treatment and Solids Generation

Solids screening and grit collection – Bar screens in the Wastewater plant head works continue to significantly reduce screening type debris in the Biosolids.

Scum – This product consists of greases and oils which enter the Wastewater plant through the collection system. A proactive program to capture and remove grease and oil at lift stations by cleaning the wet wells on a routine basis has helped reduce grease and oils contained in the Biosolids. The captured grease and oil is collected and transported to local landfills for disposal.

Portable Toilet Waste – Made minor modifications to the portable toilet waste facilities to for ease of operation.

Primary treatment – Completed fabrication of newer guards for the mechanisms. Completed installation of new gate actuators. Replaced oversized and outdated compressed air system with expectations of a two year pay of with electrical costs savings.

Plant lighting – Continue to replace plant lighting with more energy efficient units as time and funding allows (based on cost effectiveness of the replacement).

Raw sludge storage – Biosolids are held in new storage tanks prior to dewatering.

Secondary treatment – BioP facilities in the South aeration plant continue to be exceptionally effective. Began design of a project to convert the North Plant to BioP.

Changes in Flows – Billed volume remain low due to the economic climate.

Solids Stabilization, Conditioning, and Handling

Centrifuge dewatering – Centrifuge operation went smoothly during 2010. The Program Manager has been testing the performance of the units under various load rates in order

to determine which feed rate is most cost effective based on electric use, solids capture, polymer usage and recycle treatment costs.

Centrifuge thickening (WAS) – The WAS centrifuges were utilized several times during the year to enhance performance of the secondary's and to test phosphorous take up at the GVRBA facilities.

Odor control – Odor control system worked great all year. The wastewater plant did not experience any odor complaints related to the plant. The odor control media for all three (3) odor control units at the sludge processing facilities is scheduled to be changed. We have discontinued utilization of essential oils for odor control.

Hydrogen Sulfide Containment – Modifications to the silo augers are in process so that hydrogen sulfide can be captured and processed through the odor control system.

Solids Storage and Transportation

Truck loading – The contractor maintains logsheets and inspects each truck before departure from the site to ensure that there is no leakage or tracking issues. We have made significant headway in regards to diminishing the excessively high levels of Hydrogen Sulfide that was being released during loading.

Truck cover – All trucks are covered during transport to the landfill site in accordance with State law.

Truck transport to landfill – The contractor maintains records of dates, drivers, landfill sites for each load leaving the site. There were no spills in 2010

Truck Washing Procedures – The contractor maintains procedures to wash and inspect trucks to minimize odors and tracking issues.

Biosolids End Use or Disposal

Landfill – The Contractor works with the landfill to properly incorporate the Biosolids into the municipal trash. This augments the decomposition process and maximizes the potential for methane gas which is recovered and beneficially used.

Annual Operational Controls Review

Internal Audit

An internal audit of the City's EMS was conducted during the first quarter of 2010. Three (3) non-conformances identified during the audit.

Third Party Verification Audit

In the fall 2009 the City underwent it's second interim audit. The plant received some Commendations.

- There was an excellent discussion of progress made in improving operations of activities at each of the critical control points in the biosolids value chain in the 2007 and 2008 Periodic Biosolids Program Performance Report.
- Laboratory personnel demonstrated an exceptional knowledge of the biosolids EMS policy, mission statement, critical control points, operational procedures and goals and objectives and outcomes.
- The City maintains an exemplary Biosolids EMS manual that continuously improves through frequent updates and upgrades.

- The shift to using Share point has improved document control.
- And finally, the hard work and dedication of the EMS management team must be acknowledged. We have had many staff changes during the past year and have changed the EMS team member roles and responsibilities. While maintaining the EMS verification goal is obviously a team effort, the effectiveness of guidance and encouragement provided by the Acting Manager assured maintenance of this common goal.

There were also opportunities for improvement.

- Element 1.7 – Opportunity for improvement. Consider mentioning specifically in the Element 1 procedure those Biosolids management activities assigned to and performed by contractors, such as Biosolids loading and transportation.
- Element 10.1 – Opportunity for improvement. Consider preparing a schedule for completing all new SOPs associated with recently construction critical control points and the abandonment of all old SOPs that are no longer needed.
- Element 10.1 – Opportunity for improvement. The operational controls column in Table 3.1 – Critical control points, does not reference SOP 3209 – Primaries, taking tanks in and out of service.
- Element 10.1 – Opportunity for improvement. SOP 3609 – GVRBA Cake Silo and Load Out Operation does not clearly explain the details of high level loading.
- Element 10.5 – Opportunity for improvement. Cordes Trucking Company does not currently have an SOP for Vehicle Inspection, which references the inspection checklist form.
- Element 15.2 – Opportunity for improvement. In the Periodic Biosolids Program Performance Report when presenting the organization's progress toward achieving its Biosolids program goals and objectives consider presenting them as they relate to each of the required outcome areas. Also, consider presenting other accomplishments not associated with goals and objectives separately in the report.
- Element 17.1 – Opportunity for improvement. When completing Table 17.1 – Periodic Management Review of Performance Report consider including a more complete description of the review of the progress on goals and objectives. If the Periodic Biosolids Program Performance Report is used in this review it is not currently referenced in the review summary as being employed to provide details on goals, objectives, and performance measures.

Two minor non-conformances were identified in the audit and can be found in the summary of non-conformances section near the end of the report.

Interested Parties Input/Participation

- During the last quarter of each year the City develops a list of goals and objectives for the next year. As part of this process we seek input from our interested parties regarding concerns and issues they may have. We did receive feedback from one (1) interested partie in 2010 and incorporated the comment into our goals and objectives.
- Held an annual meeting with industrial users to discuss new compliance inspection procedures. Industries impact on Biosolids quality was discussed as well as the City's Biosolids EMS.

- The City will continue to keep interested parties apprised of our efforts to seek input as part of our continuous improvement process.
- The only valid request received from the web based form maintained for public comment was an agency requesting information regarding audit companies. Since 2006 there have been 2 valid entries and 15 spam entries. During 2010 the effectiveness of this approach will be re-evaluated.

Current Year Goals & Objectives

An important component of our Biosolids EMS is continual improvement. Annually goals are identified based on key outcomes, Biosolids value chain, or EMS improvements. During the past year staff determined the following new goals would help us achieve these objectives:

Maintenance of Sanitary Sewers

- Clean all sanitary sewers fifteen (15) inch and smaller once every five years in order to maintain the integrity of the biosolids, protect the environment and avoid system upsets that can result in sanitary sewer back-ups in residences and business facilities, violation of applicable local, state and federal regulations as well as pose public health and safety concerns.

Improve Performance of Assets

- Expose high maintenance equipment and/ or systems through better utilization of our CMMS reporting function to track man-hour utilization, based on classification and cm versus pm work.

Commendable Service

- Maintain a 75% satisfaction rating among those citizens we have serviced by surveying the customers that have reported issues and those involved in the Footing Drain Disconnection Program.

Biosolids Quality

- Perform quarterly analysis on WWTP biosolids and compare results with those found in tables associated with federal regulations 503.

Upgrade CMMS

- During 2010, we will upgrade the CMMS program to better maintain ESD facilities and equipment.

BOD

- Track C-BOD, TSS, ammonia and TP attributed to the North Plant Modification Project.

Summary of Non-Conformances

2010-1

- As part of the internal audit it was discovered that Goals and Objectives for 2010 were not available on the Sharepoint ESD site.

2010-2

- As part of the internal audit it was discovered that Element 13 did not clearly explain the quarterly reviews of Goals and Objectives which included a meeting with EMS Coordinator and had not been update to reflect changes to Element 4 regarding reviewing legal and other requirements annually.

2010-3

- As part of the internal audit it was determined that Non-Conformances 2009-2, 2009-3 & 2009-5 required some additional information and corrections..

2010-4

- 1st quarter of 2010, table 13.1 and figure 5.1 were not submitted for Sewer Assessment goal in a timely manner. Responsible party on vacation – need to plan better.

2010-5

- 2nd quarter of 2010, table 13.1 and figure 5.1 were not submitted for Sewer Cleaning goal in a timely manner. Responsible party on vacation – need to plan better.

2010-6

- 2nd quarter of 2010, form 10.2 was not submitted for Cordes in a timely manner. Responsible party on vacation – need to plan better.

2010-7

- Annual CCP Periodic Review for 12 of the 17 Critical Control Points were received on August 12, 2010 which is after the deadline (prior to August 1, 2010). Need to communicate expectations and assignments to team members better.

2010-8

- Annual Legal and other Requirements Document Review for 5 of the 10 areas as spelled out in table 4.1 were received on August 18, 2010 which is after the deadline (prior to August 1, 2010). Need to communicate expectations and assignments to team members better.

2010-9

- 3rd quarter of 2010, table 13.1 and figure 5.1 were not submitted for Grit Pass Assessment goal in a timely manner. Need to plan better.

2010-10

- The “Annual Operational Controls Review” exposed that the newer SOP’s that are associated with “Critical Control Points” are not listed in table 3.1 and that SOP’s that are obsolete are still listed on table 3.1. It was also found that some SOP’s are out of date with current operating procedure and need updating. Updated SOP 1110 to reflect need to add SOP’s associated with CCP’s to table 3.1 of EMS policy.

Summary

Implementing and maintaining Biosolids EMS continues to prove to be a meaningful endeavor. Success has only been achieved through the hard work and dedication of staff and our contractors as well as support from administration and the National Biosolids Partnership. A great deal of credit for the success of our program goes to the recently retired Department Manager and the current Acting Department Manager. Their guidance and patience have been invaluable to our program. Continual improvement of our Biosolids management practices and EMS are an ongoing process which will only improve as new practices are developed. Non-conformances which are identified assist in strengthening our management practices and improve the overall effectiveness of the Biosolids EMS. We believe that the new goals we have identified for 2011 will further improve our Biosolids quality and management practices.

Kathie Kuzawa
EMS Coordinator