Town of Newburgh, Indiana

Capacity, Management, Operation and Maintenance (CMOM)

"An Information Management System for Newburgh's Sanitary Sewer System"

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Newburgh

ON THE OHIO

Sister City to Newburgh, England

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TOWN OF NEWBURGH, INDIANA
CAPACITY, MANAGEMENT, OPERATION AND MAINTENANCE (CMOM)

"AN INFORMATION MANAGEMENT SYSTEM FOR NEWBURGH'S SANITARY SEWER SYSTEM"

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- BLOODBORNE PATHOGENS EXPOSURE CONTROL PROGRAM
- BYPASS-OR OVERFLOW INCIDENT REPORT
- COMPLAINT LOG
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- CONFINED SPACE ENTRY WRITTEN PROGRAM
- DESIGN AND CONSTRUCTION STANDARDS
- DISCHARGE MONITORING REPORT
- EMERGENCY ACTION PLAN
- EMERGENCY STATION PUMPING
- FINANCIAL MANAGEMENT REPORT FOR CALENDAR YEAR 2004
- FLOW MONITORING REPORT
- FORCE MAIN PRESSURE RUNNING DATA
- GUIDE FOR COLLECTION SYSTEM
- HAZARD COMMUNICATION PROGRAM
- IDEM ADDRESS
- INDUSTRIAL MMR 30530

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- INTERIM REPORT – SMOKE TESTING
- IPEP RECOMMENDED TRAINING DOCUMENT
- LIFT STATION #1 O&M – BBC PUMP & EQUIPMENT COMPANY
- LIFT STATION INFORMATION SHEET
- LIFT STATION PUMP HOURS
- LOCKOUT/TAGOUT PROGRAM
- MAINTENANCE CLEANING
- MANHOLE MAINTENANCE RECORD CARD
- MASTER PLANNING REPORT
- MONTHLY REPORT OF OPERATION (MRO)
- NEWBURGH SYSTEM MAP
- NPDES PERMIT
- NPDES PERMIT NONCOMPLIANCE FORM
- O&M MANUAL
- ON-CALL SCHEDULE
- ORDINANCE – PRETREATMENT NO. 2000-1
- ORDINANCE – RATE – NO. 2002-7
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- ORGANIZATIONAL CHART
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  - PLANT MAINTENANCE TECHNICIAN
  - PLANT OPERATOR / LAB TECHNICIAN
  - COLLECTION SYSTEM SUPERVISOR
  - COLLECTION SYSTEM ASSISTANT SUPERVISOR
  - WASTEWATER PUMP STATION O & M SPECIALIST
  - COLLECTION SYSTEM O & M
- WASTEWATER TREATMENT FACILITY ADDRESS
- WASTEWATER UTILITY STAFF
- WWTP DESIGN SUMMARY

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INTRODUCTION

The Town of Newburgh has developed a collection system's Capacity, Management, Operation, and Maintenance (CMOM) program designed to help optimize the performance of their sanitary sewer system. In accordance with US EPA documents, the major objectives of such a program include:

a) Manage, operate and maintain at all times, all parts of the collection system so that the Town of Newburgh fully complies with the Clean Water Act.

b) Establish, in a timely fashion, sufficient capacity to convey base and peak flows without sanitary sewer overflows for all parts of the collection system.

c) Implement, in a timely fashion, all feasible steps to stop, and mitigate the impact of, sanitary sewer overflows from any portion of the collection system.

d) Provide timely notification of sanitary sewer overflows from the collection system to all persons with reasonable potential for exposure to pollutants from such sanitary sewer overflows.

It is important to note that there are no piped overflow points within the Town's sanitary sewer collection system. Therefore, any system overflows are related to sewer line blockages and/or mechanical equipment failure. When either of these events occurs, they are corrected and mitigated in accordance with our emergency response procedures. Generally, these events are not directly related to wet weather conditions.

When utilizing the following document, the reader is advised that all text in blue represents "links" to embedded materials. By clicking on the blue text, the reader is taken directly to the referenced document.

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"AN INFORMATION MANAGEMENT SYSTEM
FOR NEWBURGH'S SANITARY SEWER SYSTEM"

A. GENERAL COLLECTION SYSTEM DESCRIPTION

The Newburgh wastewater collection system services the incorporated Town as well as significant adjacent areas. In total, the sewer utility provides service to an area encompassing approximately 16,000 acres of land, serving approximately 8,200 customers. Other significant statistics of the utility are:

- Annual average precipitation: 45.72"
- Miles of gravity sewer: 161 ranging in size from 6" to 24" in diameter
- Miles of force main sewer: 19 ranging in size from 2" to 16" in diameter
- Number of pump/lift stations: 26
- Number of service connections:
  - Residential: 7,757
  - Commercial: 416
  - Industrial: 7
  - Group Account: 1
  - Public Authority Account: 13
  - Sale for Re-sale Account: 1

  Total: 8,195
- Wastewater Treatment Plant (WWTP) design average flow 4.6 MGD
- WWTP peak design flow 14.8 MGD
- NPDES Permit No. IN 0023892
- WWTP design summary

B. COLLECTION SYSTEM MANAGEMENT

1. Organizational Chart

General:

A municipal utility of this size requires good organization and competent staff to provide the quality services demanded by the customers. To facilitate this effort, the Town developed an organizational structure designed to be responsive to the needs of its customers while being fiscally responsible at the same time. The attached organizational chart depicts the decision-making hierarchy.

2. Staffing Plan

General:

The wastewater treatment plant is staffed during the hours of 7:00 am to 3:30 pm, seven days a week. The collection system personnel work during the same hours, but only on weekdays. After the normal working hours, there are always two employees on-call covering both the plant and collection system.

All of the collection system lift stations and the wastewater plant are equipped with auto-dialer systems to contact the on-call employees via cellular telephone. To insure quick, reliable notification of a problem, two cellular telephones are rotated between the on-call staff. At the beginning of each calendar year, the Wastewater Facilities Superintendent prepares an on-call schedule. All staff under the Wastewater Facilities Superintendent rotate through the on-call schedule with the exception of the Plant Supervisor and the Plant Operator/Laboratory Technicians. The Plant Supervisor and the Plant Operator/Laboratory Technicians are exempted because they already rotate through weekend duty to provide 7-day per week coverage. The normal rotation for plant staff is to work 8 days with 2 days off followed by working 7 days with 4 days off.

Responsibility Hierarchy:

As is the case for all Towns in Indiana, the Town Council has the ultimate responsibility for all functions performed by employees. In Newburgh's case, they established a liaison position, filled by one of the elected council members and given the title of Utility Commissioner, whose responsibility is to stay abreast of all activities associated with the Sewer Department and to report back to the entire Town Council regarding the Department's activities. This liaison council member, in turn, serves as the chairman of the Utility Committee which meets once per

month, or more often if necessary, to discuss the business of the sewer utility and make recommendations to the Town Council for official action. The membership of the Utility Committee was established by motion and vote of the Town Council and consists of the Utility Commissioner; an additional, appointed Town Council member; the Town Administrative Manager; the Wastewater Facilities Superintendent; the Utility Office Manager; the Town's attorney; and a representative from the Town's engineering firm.

Specific Staffing:

The Newburgh wastewater utility is managed by a total of seventeen (17) full-time staff members organized by specific duties.

3. Record Keeping

General:

There are a myriad of record keeping activities associated with the operation and maintenance of a wastewater collection and treatment system. Therefore, accurate and complete record keeping is crucial. Equally important are the mechanisms for archiving and retrieving the collected data.

Currently, the Town of Newburgh keeps records on many activities including the following:

Item	Form (Electronic, Manual)	Where Kept	Responsible for Maintenance
Collection System:			
Sewers:			
Sewer atlas, including size and general location of pipe and manholes	Electronic & Manual	Plant	C.S. Supervisor
As-builts drawings of new sewers	Electronic & Manual	Plant	C.S. Supervisor
Inspection reports for new sewer connections	Electronic & Manual	Plant & Sewer Office	C.S. Supervisor & Office Manager
Flow metering information	Electronic	Plant	Superintendent
Smoke testing information	Manual	Plant	C.S. Supervisor
Dye Testing	Manual	Plant	C.S. Supervisor
Physical inspection including manhole inspection and internal televising	Manual	Plant	C.S. Supervisor
Manhole maintenance records	Manual	Plant	C.S. Supervisor
Customer complaint logs	Electronic & Manual	Plant	C.S. Supervisor

Item	Form (Electronic, Manual)	Where Kept	Responsible for Maintenance
Ordinances:			
Use Ordinance	Manual	Town Hall	Clerk Treasurer
Pretreatment Ordinance	Manual	Town Hall	Clerk Treasurer
Rate Ordinance	Manual	Town Hall	Clerk Treasurer
Confined space entry permits	Manual	Plant	C.S. Supervisor
Bypass/overflow incident reporting	Electronic & Manual	Plant	Superintendent
Sewer maintenance cleaning records	Manual	Plant	C.S. Supervisor
Hydrogen sulfide control	Electronic & Manual	Plant	Superintendent & C.S. Supervisor
Pumping Stations:			
Operation and Maintenance Manual	Manual	Plant	C.S. Supervisor
Preventative maintenance logs	Electronic & Manual	Plant	C.S. Supervisor
Emergency maintenance logs	Electronic & Manual	Plant	C.S. Supervisor
Station setting data (i.e., alarm levels, etc.)	Electronic & Manual	Plant	C.S. Supervisor
Pump discharge pressure data	Electronic & Manual	Plant	C.S. Supervisor
Pump motor run time data	Electronic & Manual	Plant	C.S. Supervisor
Critical parts inventory	Electronic & Manual	Plant	C.S. Supervisor
Station check valve data	Manual	Plant	C.S. Supervisor
Treatment Plant:			
Operation manuals	Manual	Plant	Superintendent
Maintenance manuals	Manual	Plant	Superintendent
Maintenance logs	Electronic	Plant	Superintendent
Noncompliance notification	Electronic & Manual	Plant	Superintendent & Plant Supervisor
Parts listings and spare parts inventory	Electronic & Manual	Plant	Superintendent & C.S. Supervisor
NPDES Permit	Electronic & Manual	Plant	Superintendent
Monthly Report of Operation (MRO)	Electronic & Manual	Plant	Superintendent & Plant Supervisor
Discharge Monitoring Report (DMR)	Electronic & Manual	Plant	Superintendent
Monthly Monitoring Report (MMR)	Electronic & Manual	Plant	Superintendent & Plant Supervisor
Sludge Disposition Report	Manual	Plant	Superintendent

Historically, the system has been set up for manual, hard copy, records. Recently, more and more of this data is kept in digital format. Like most communities of their size, the Town is working on a systematic, electronic database system to keep their records.

4. Job Descriptions

General:

The following job descriptions have been developed so as to clarify the Town's expectations of its employees.

- **Job Title:** Wastewater Facilities Superintendent

  General Statement of Duties:

  - Responsible for the direct and indirect supervision of all wastewater treatment related systems, activities, and personnel.
  - Plans, organizes, and provides direction for the operation and maintenance of the wastewater treatment plant and the sanitary sewer collection system.
  - Is an active member of the Utility Committee.

- **Job Title:** Plant Supervisor

  General Statement of Duties:
  - Directs and supervises the routine operation and maintenance of the wastewater treatment plant.
  - Plans, organizes, and provides direction for the wastewater treatment plant's analytical laboratory.

- **Job Title:** Plant Assistant Supervisor

  General Statement of Duties:

  Performs skilled and semi-skilled work in the operation and maintenance of a variety of equipment, instrumentation, unit processes, and unit operations at the wastewater treatment plant.

- **Job Title:** Plant Team Leader

  General Statement of Duties:

  Performs a variety of routine analyses of water, wastewater, and sludges in support of the wastewater treatment facilities operation. Also monitors and participates in the operation and maintenance of plant processes and equipment.

- **Job Title:** Plant Maintenance Technician

  General Statement of Duties:

  Performs skilled and semi-skilled work in the maintenance and repair of a variety of equipment, vehicles and facilities at the wastewater treatment plant. Schedules and performs preventative maintenance activities for all equipment and maintains maintenance logs. Maintains inventory and orders routine materials and supplies. Works closely with operations staff to insure equipment servicing and repair will not adversely affect the plant operation.

Job Title: Plant Operator / Lab Technician

General Statement of Duties:

Performs a variety of routine analyses of water, wastewater, and sludges in support of the wastewater treatment facilities operation. Also monitors and participates in the operation of plant processes and equipment.

- **Job Title:** Collection System Supervisor

  General Statement of Duties:

  This position is responsible for the operation and maintenance of the sanitary sewer collection system and supervision of assigned personnel.

- **Job Title:** Collection System Assistant Supervisor

  General Statement of Duties:

  Performs skilled and semi-skilled work in the operation and maintenance of a variety of equipment, instrumentation, and facilities within the wastewater collection system.

- **Job Title:** Wastewater Pump Station O & M Specialist

  General Statement of Duties:

  Performs skilled and semi-skilled work in the operation and maintenance of a variety of equipment, instrumentation, and facilities within the wastewater collection system.

- **Job Title:** Collection System O & M

  General Statement of Duties:

  Performs skilled and semi-skilled work in the operation and maintenance of a variety of equipment, instrumentation, sanitary sewers, and facilities within the wastewater collection system.

- **Job Title:** Administrative Assistant

  General Statement of Duties:

  Provides administrative support to the Town Administrative Manager in the overall administration of town operations; performs complex, responsible and confidential administrative duties for the Town Administrative Manager, Council members, Chief of Police, Clerk Treasurer, Park Department, Sewer Department, and other departments as requested.

- **Job Title:** Office Manager

  General Statement of Duties:

  - Plans, organizes, and provides direction for the operation and maintenance of the Sewer Department office.
  - Supervises all Sewer Department office personnel
  - Supervises, directly or indirectly, all wastewater treatment related accounts payable, accounts receivable, sewer office personnel service records, and the sale of sewer permits.
  - Participates as an active member of the Utility Committee.
  - Works with developers and contractors on sewer development.
  - Works with state permitting agencies.
  - Facilitates the payment of bonds and interest.
  - Communicates with the Wastewater Facilities Superintendent on any complaints or problems.

- **Job Title:** Clerk / Assistant Office Manager

  General Statement of Duties:

  Performs accounting and bookkeeping duties. Interfaces directly with water companies supplying Newburgh sanitary sewer customers. Communicates with the Plant Supervisor and Collection System Supervisor regarding customer satisfaction and complaints.

- **Job Title:** AP / AR Clerk

  General Statement of Duties:

  Performs accounting and bookkeeping duties for the Sewer Department office.

Job Title: Clerk (Part-Time)

General Statement of Duties:

Performs office functions that coordinate with the Sewer Department Clerks in the assistance of the Sewer Office Manager.

5. Use Ordinances

General:

Proper control of the Sewer Utility includes establishing appropriate ordinances to provide regulatory/legal authority to insure optimal performance and compliance with pertinent regulatory requirements. Applicable ordinances include 1) a rate ordinance establishing the cost of service, 2) a sewer use ordinance limiting the discharges into the system, and 3) a wastewater pretreatment ordinance to prevent the introduction of pollutants incompatible with the treatment works.

Specifically:

a) Ordinance No. 1987-1; An Ordinance Controlling Sewer Connections and Waste Water Disposal, Fixing the Schedule of rates and Charges to be Collected by the Town of Newburgh and Other Matters Connected Therewith.

b) Ordinance No. 2000-1; An Ordinance Establishing Uniform Standards for Issuance of Wastewater Discharge Permits.

c) Ordinance No. 2002-7; An Ordinance Establishing a New Schedule of Rates and charges to be collected by the Town of Newburgh from the owners of property served by the sewage works of the Town and other matters connected therewith, amending Ordinances No. 1987-1, 1989-8, 1990-30, 1998-1 and 2001-3.

6. Sewer System Mapping

General:

An accurate sewer atlas is a fundamental requirement for any Sewer Utility. This mapping allows staff to do a variety of activities including: 1) answer questions from current and potential customers; 2) visually establish system performance trends; 3) track maintenance activities; and 4) facilitate the orderly extension of sewer service.

Specifically:

Several years ago the Newburgh Sewer Utility commissioned the development of a sewer atlas utilizing an aerial photograph as the base map. An overall index map was created depicting the entire service area and breaking it down into numbered sections for easy location of larger scale, detailed mapping. All of the data is in digital format and the AutoCADD program is used for display. The aerial mapping was used as the base layer with additional layers added to represent the various street names, subdivision names, sewer lines and pumping stations within the system. The base mapping was updated in 2002 to provide coverage for newly serviced areas and to add newly constructed sewers. The scale for the index map is 1" = 500' while each of the individual sub-maps has a scale of 1" = 400'. The sewers and appurtenances are color coded for easy line size and location recognition.

Copies of the sewer atlas are maintained: 1) in the Utility Office located in the Town Hall building, 2) at the wastewater treatment plant, and 3) carried in the vehicles used by the collection system crew. Existing maps are annotated for corrections as discrepancies are discovered. Generally, corrections are made to the original mapping on an annual basis, depicting these referenced corrections and new modifications and/or additions to the system.

7. Safety Manual

General:

The Town of Newburgh has an extensive safety program to insure that the work environment for the employees is a safe and healthy one. At the same time, the program is also designed to protect the general public during the normal course of operating and maintaining the system. In addition to their general safety standards, the Town has created several specific programs to help protect its employees.

Specifically:

a) Lockout/Tagout Program – Updated February, 1999

This program was written in conformance with OSHA 1910.147 and established procedures to prevent the unintended release of stored energy which may energize a machine or equipment, causing injury to an employee.

b) Bloodborne Pathogens Exposure Control Program – Updated February, 1999

This program was written in conformance with OSHA 1910.1030 and was established to adopt universal precautions in order to prevent contact with blood or other potentially infectious materials.

c) Hazard Communication Program – Updated February, 1999

This program was written in conformance with OSHA 1910.1200 and established to insure that the hazards of all chemicals located in the plant are evaluated and that pertinent information is transmitted to potentially exposed employees.

d) Confined Space Entry Program – Updated February, 1999

This program was written in conformance with OSHA 1910.146 and was established to insure that employees do not enter potentially dangerous spaces without taking adequate and proper safety measures.

8. Confined Space Entry Policy

General:

In 1993, OSHA adopted the Confined Space Entry Rule. Supporting documentation for the Rule estimated that 1.6 million workers enter confined spaces annually and predicted that 54 deaths and more than 5,000 serious injuries will be prevented each year as a result of adopting this Rule. The standard is intended to protect workers from toxic, explosive or asphyxiating atmospheres. It focuses on areas with immediate health or safety risk, denoting them as "permit required" spaces. It further requires that employers identify all permit required spaces in their workplaces, prevent unauthorized entry and protect authorized workers from hazards through a permit space program.

Generally, a confined space is defined as an enclosed space having all of the following characteristics: 1) limited or restricted means of entry or exit, 2) large enough for a person to enter, and 3) not designed for continuous employee occupancy. Examples of typical confined spaces include: manholes, sewers, culverts, underground utility vaults, storage tanks, septic tanks, and pits over four feet deep.

Employers are required to instruct all employees, who have to enter into confined or enclosed spaces, as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required. Although under certain circumstances, a whole host of hazardous conditions can exist in wastewater collection and handling systems, the most common concerns center around: 1) the presence of hydrogen sulfide (H_2S) gas, 2) carbon monoxide (CO) gas, 3) insufficient oxygen in the atmosphere, and 4) the presence of combustible gasses.

Specifically:

The program developed by the Town of Newburgh established a written protocol for: 1) determining if a space is a permit required confined space, 2) the list of required equipment for confined space entry, 3) safe entry checklist, and 4) entry permit for permit required spaces. It further identifies the following permit only entry areas: 1) all manholes, 2) all pumping stations (unless equipped with continuous ventilation that has been confirmed to be operational), and 3) drained digesters and other tanks at the wastewater treatment plant site.

9. Training Program Documentation

General:

In an effort to insure that the Newburgh Sewer Utility employees have been provided with adequate and proper safety and confined space entry training, the Town has established training goals as outlined below.

Specifically:

The Newburgh Sewer Utility employees have been divided into two groups based upon their daily work assignments and the associated potential for exposure to workplace dangers. Specifically, the Plant Operator/Laboratory Technicians are not exposed to dangers present away from the wastewater treatment plant site. Therefore, recommended training will be designated as appropriate for the Plant Operator/Laboratory Technicians and then all others employees. The Town of Newburgh has worked with the Indiana Public Employers Plan (IPEP) Loss Control Department regarding recommended training for their utility employees.

The Town keeps a written record of the training each employee receives to document this effort.

Additionally, the Town encourages all Collection System employees to obtain the Indiana Water Environment Association (IWEA) Voluntary Wastewater Collection System Operator Certification. In fact, all current collection system personnel, with the exception of one recent hire, have obtained this credential. The Town is committed to continuing education in this area and, as such, they encourage all employees to obtain at least five (5) contact hours per year of continuing operation and maintenance education.

10. Information Tracking

General:

There is a myriad of data collected during the course of running a sewer utility. Such things as: 1) initial construction and as-built data, 2) system operational settings such as pump run controls, 3) routine preventive maintenance requirements and records of maintenance performance, 4) customer complaint logs, 5) emergency maintenance issues, 6) NPDES Permit monitoring and reporting requirements, 7) sewer use, rate and pretreatment ordinances, 8) system monitoring including I/I and SSES investigative work, 9) system improvements and extensions, 10) employee training, and 11) sanitary sewer modeling to predict flows under extrapolated precipitation conditions, etc., all require tracking and archiving.

11. Collection System Master Plan

General:

Ohio Township in Warrick County is one of the fastest growing areas in the State of Indiana and has been for at least the last 10 to 15 years. Therefore, the Town of Newburgh, which provides sewer service to much of this area, decided many years ago that routine master planning was fundamental to the orderly growth and development of their utility. The most recent complete update of this document was completed in August of 1999. Although conventional 20-year forecasting techniques were utilized, the report recognizes that due to the dynamic nature of the growth in the area, it will likely be necessary to update this planning document at least every 5 years. In fact, the 5-year update was completed in February of 2004.

Specifically:

The specific purpose of the master planning effort is to undertake engineering analyses to: 1) determine the existing capacities of the Newburgh Sewer Utility's collection and treatment system, 2) document deficiencies from either regulatory or performance perspectives, 3) project future needs, both short and long-term, and 4) estimate associated capital expenditures and their impact on user rates to insure that adequate financial resources are available to operate, maintain and expand the system.

Inasmuch as the majority of the customers of the Newburgh Sewer Department reside outside the corporate limits of the Town of Newburgh, the first step of the planning effort is to establish the planning area limits. The Town, based upon input from their Utility Superintendent, Attorney and Engineers, established the potential service area. The next step is to look at historical population growth/development trends to project future needs. Next, alternative means of meeting the anticipated needs were screened and costs developed for each alternative. Finally, recommendations were developed including anticipated costs and project timing to facilitate planned, orderly improvements to the system. This Master Plan envisioned improvement projects every year and specifically identified those for the next 10 years or so.

It is also the standard practice of the Town to recommend an annual reconsideration of projects and priorities before embarking on the projects proposed for that year. New issues come along and may force the reprioritization of efforts. The dynamics of this process continue to direct limited resources to the areas of greatest need.

The 2004 Master Plan update utilized the hydraulic sewer model to identify capacity limitations in the major sewer interceptor lines. Specifically, using a color-coded scheme, the lines were divided into green, yellow and red. The green lines represent those with adequate capacity; yellow lines with marginal capacity where caution has to be exercised (perhaps requiring flow metering to confirm capacity availability); and red lines where limited, if any, additional flow

should be added. Specifically, this study identified the anticipated future loading on the west side of the system and determined that without improvement, several sewer reaches would be at or over capacity. To prevent this, the West Side Master Lift Station Project was conceived and is currently under construction. Once complete in early 2006, the modeling predicts that the anticipated future loading can be readily handled with all interceptors showing in the green.

12. Program Audits

General:

The previous section outlined a good example why program audits are absolutely necessary to optimize any utility operation. If the 1999 Master Plan and the 2004 update were blindly followed, then significant issues that have surfaced since the development of the planning document would have been ignored. It only makes good sense to periodically review (audit) program goals, objectives and performance on a routine basis and then make modifications as appropriate.

Specifically:

According to the United States Environmental Protection Agency (US EPA), the "purpose of capacity, management, operation, and maintenance ("CMOM") programs is to optimize labor, materials, money, and equipment. In other words, the goal of such programs is to manage the system's human and material resources as effectively as possible while achieving regulatory compliance and delivering a high level of service to customers." Since regulatory compliance is one of the objectives of this program, it stands to reason that the regulatory agencies would develop audit protocols in an effort to insure program optimization. In this case, it is anticipated that a regulatory audit will be performed annually. Said audit will be conducted by the Utility Committee in the first quarter of the following year to facilitate access and use of all year-end reporting and will include the annual report required by the consent decree. As part of the audit, we will include an SSO trend analysis which shows results for the past three (3) years. This audit will also include an annual update of the prioritized capital improvements project listing.

The Town intends to generally conform to the January, 2005 "Guide For Evaluating Capacity, Management, Operation, And Maintenance (CMOM) Programs" published by the US EPA.

C. COLLECTION SYSTEM OPERATION

1. Operation Budgeting

General:

At the beginning of each year, the Town Administrative Manager meets with the Wastewater Facilities Superintendent and the Office Manager to review the financial situation of the utility. The cash balances of the various accounts are analyzed and the projected expenditures, both maintenance and capital, for the year reviewed. Projects are prioritized and work schedules prepared. In the event that the magnitude of critical capital expenditures are larger than the available cash, then the process of applying for funding or selling bonds is initiated. Annually, a management report is prepared by the Utility's Certified Public Accountants assessing the financial condition of the Utility and revenue generation capability of the current fee structure versus the defined financial needs.

Specifically:

The most recent Management Report for the Newburgh, Indiana Municipal Sewage Works is dated February 17, 2005 and covers the 2004 calendar year. In fact, comparable information including budgets from the Utility is provided for the prior two years (2003 and 2004) as well.

As mentioned in section A. 11., the Master Planning Report for the Wastewater Collection & Treatment Utility includes an Implementation Schedule (Table A) summarizing the prioritized capital improvements project listing with anticipated construction dates. At the beginning of each year, the list is reviewed to determine if the prior years projects were completed so that focus can be directed to those delineated for this year. If project slippage, new projects or a reprioritization has occurred, then schedule readjustment is accomplished and the anticipated construction for the current year planned.

Routine preventive maintenance activities are budgeted through staffing requirements and recurring maintenance expenses.

2. Permit Compliance

General:

The Town of Newburgh operates under a National Pollutant Discharge Elimination System (NPDES) Permit, which establishes discharge limits from the treatment facility and identifies the required monitoring and reporting. This reporting data is submitted to the Indiana Department of

Environmental Management (IDEM), on a monthly basis, and entered into a computer database for evaluation. Compliance issues are evaluated for severity, and appropriately handled.

Specifically:

The Town's Sewer Utility is required to submit two reporting forms on a monthly basis. The first is the Discharge Monitoring Report (DMR), which is a United States Environmental Protection Agency (US EPA) prescribed form that focuses on the plant discharge. This report is submitted to IDEM, which in turn performs the data entry into the US EPA database, referred to as the Permit Compliance System (PCS). The second monthly report, entitled the Monthly Report of Operation (MRO), is submitted to IDEM, but this report looks at the entire plant process and not just the effluent.

In the event of a sewer system bypass, IDEM requires that a Bypass/Overflow Incident Report form be FAX'ed to the agency within 24 hours. This is also noted in the comment section of the MRO.

IDEM reviews the DMR data and produces a Quarterly Non-Compliance Report (QNCR) in accordance with US EPA requirements. Based upon this report and input from IDEM staff, they in turn develop a Significant Non-Compliance (SNC) report which requires action by the agency and ultimately, the affected community. Depending on the severity of the matter, IDEM may issue a violation letter or if the compliance issue is deemed to be more severe, they may refer the matter to the Water Enforcement Section of the Office of Enforcement for administrative action.

3. Monitoring

General:

The very nature of the wastewater collection system (buried with little exposed infrastructure) poses difficulty with monitoring system performance. Unless there is an overflow in a public location or a customer makes a complaint, it is not readily evident that a problem exists. Therefore, it is imperative that a sewer utility develops a routine, regular monitoring program to locate potential problems before they manifest themselves.

Specifically:

The major components of the wastewater collection system include the gravity sewers, the lift stations and the force mains. Each component requires a monitoring program and each program is different.

Unlike the pressurized sewers in the system, there are no easy means to monitor gravity sewer operation. The Town owns two portable flow meters that can be installed in the gravity portion of the collection system to monitor flow at points within the system. This data can be compared over time for significant changes. In 1995, the Town commissioned an extensive flow metering study, breaking the collection system into 21 sub-systems. One of the main purposes of this study was an effort to locate sections of the system prone to excessive infiltration/inflow (I/I). Another reason for the study was to gather data to assist in the development of a computer model of the sewer system. All of this data is used to help locate problem areas prone to excessive I/I and monitor sub-system flows for capacity purposes.

Once a suspected problem sub-system is located, additional evaluation is required to pinpoint the problem(s). To assist in this, the Town has purchased all necessary equipment to smoke test sections of sewer pipe looking for potential inflow sources and to internally inspect these pipe reaches via closed circuit television looking for defects resulting in I/I. One final tool employed by the Town is the use of dyed water flooding to verify inflow sources. All of these techniques are used periodically, as the appropriate need is identified.

There are 26 lift stations within the Newburgh wastewater collection system. Each of these stations is equipped with an automatic dialer system capable of notifying the collection system staff of a problem. In general, there are alarm conditions for high/low water levels and power failure. If one of these conditions exists, the automatic dialer makes an alarm call to the staff during regular business hours or to the on-call staff via cellular telephone. Additionally, there are two physical inspections per week of each of the lift stations. During those inspections, overall conditions are inspected and notations of pump run time and force main pressure are made. This data is monitored over time to observe changes that might suggest the beginning of a problem.

It is the goal of the Sewer Utility to provide standby power at each of the major lift stations (Numbers 1, 2, 3, 5, 8 and 12). To date, this has been completed at stations 1, 2, 3, 5 and 8. Lift station #12 is scheduled for the next 5 to 10 years. The generators are programmed for a test run every Tuesday morning between 9:00 am and 10:00 am. They are set to run for 15 minutes and generally operations staff witnesses the test.

Twice annually, all of the air relief valves on the system force mains are inspected to insure proper operation.

The wastewater plant is equipped with a state of the art Supervisory Control and Data Acquisition (SCADA) system. This system monitors all plant operations and is programmed with over 200 alarm conditions. In the event of an alarm condition after normal working hours, the SCADA system sends a signal to an automatic dialer to contact the appropriate on-call staff. In addition, there is a back-up alarm on the Sequential Batch Reactors (SBRs). Any time there is an SBR programmable logic controller (PLC) alarm condition, an independent automatic

dialer will contact the on-call staff. As mentioned previously, there is a back-up on the main plant lift station (#3) in the form of the automatic dialer, separate from the SCADA system that is hardwired with its own phone line to facilitate off hours call out.

4. Operation and Maintenance (O&M) Manuals

General:

The O&M Manual is prepared to provide specific guidelines to operating staff to help in attainment of regulatory permit requirements and top efficiency in the operation and maintenance of the various facilities in the system.

Specifically:

The Newburgh Sewer Utility maintains a complete set of O&M Manual books for every lift station and the wastewater treatment facility. These are maintained at each respective station and at the treatment facility and organized for quick access.

A typical lift station O&M Manual is comprised of detailed information on the specific equipment installed in the station including: performance data; parts listings and scheduled maintenance programs; trouble shooting tips; and a list of operating/alarm set points. As mentioned previously, the Sewer Utility has installed taps on all lift station discharge lines to facilitate the collection of discharge pressure readings. This data can be compared to the pump discharge curve to confirm proper pump performance.

5. Safety Program

General:

Wastewater utility personnel are subject to bodily injury just as workers are in all industry. However, the wastewater industry also has a high potential for accidents from noxious gases, bacteria, and viruses. Therefore, anyone engaged in the operation of a wastewater collection and treatment system must be familiar with safety practices that pertain specifically to this profession.

Specifically:

As previously referenced, very specific training is needed for employees working for a wastewater utility. There is, of course, the need for training in the normal hazards associated with the general construction industry such as backhoe/loader use, basic electrical safety, fall protection, flagger safety, ladder safety, etc. Additionally, there are also several areas requiring specialized training including: bloodborne pathogens, chlorine safety, material safety data sheets (MSDS), confined space entry, hydrogen sulfide hazards, and general treatment plant safety.

Section 8 of the Town of Newburgh Wastewater Treatment Plant O&M Manual specifically addresses the safety program. This document also references several excellent reference publications that can be used to augment the safety training program.

6. Emergency Preparedness

General:

Effective emergency management planning requires considerable coordination and forethought. There are various types of emergencies and/or disasters that can have a very negative impact on the operation of a sewer utility. In February of 1999, the Town of Newburgh adopted the Emergency Action Plan for Employees of the Town of Newburgh. This document, patterned after OSHA Standard 1910.38, is designed to protect the Town and/or its employees from serious injury, property loss, or loss of life in the event of a major disaster.

Specifically:

Emergency preparedness for the Sewer Utility takes on another dimension in that continued utility operation also comes into play. One of the most common emergency events is an electrical power outage. Most wastewater treatment facilities, including Newburgh's, are equipped with a standby generator capable of powering the essential plant equipment to insure that proper treatment continues even during the outage. In fact, the Newburgh facility is equipped with an automatic transfer switch, which signals the generator to start even after normal working hours. Section 7 of the Newburgh O&M Manual is devoted to "Emergency Plans and Operating Procedures".

With 26 lift stations throughout the collection system, it is also crucial that some means exist to keep the wastewater moving toward the treatment facility. Previous sections of this document have discussed the existence of standby generators at some of the key lift stations and plan to add standby power to others in the relatively near future. Additionally, the Town has begun the process of equipping each lift station with the necessary fittings to facilitate the connection of a

portable, bypass pumping unit which can be moved throughout the system to relieve sewage backup during an extended outage. In this manner, sewerage service can be maintained during this emergency event. Additionally, Utility personnel have identified the anticipated overflow points that will likely occur during extended power outages. These points are prioritized and monitored, as appropriate, to try to prevent an actual bypass/overflow incident.

Emergency overflows can represent another significant event requiring quick action on the part of the Sewer Utility. The Utility has established the following procedures for just such an event:

a) Minor Overflow in Sewer Main

When faced with this situation and unless there is direct surface evidence to the contrary (sink hole in street), the collection system personnel assume that there is some type of line blockage and the jet cleaning machine is used to clean the sewer. If that effort is unsuccessful, the portable pump is used to pump around the blockage and mitigate the overflow event. At the same time, the internal closed circuit television equipment is used to inspect the line to determine the exact nature of the obstruction. If more aggressive cleaning or root removal won't solve the problem, emergency underground utility locates are requested and the area is excavated to make the necessary repair.

b) Significant Overflow in Major Interceptor

The above-referenced protocol still applies with the exception that the Utility's portable pumps will be augmented with rental equipment, available locally, to increase the total pumping capacity so as to handle the flow and eliminate the overflow.

c) Force Main Break

A force main break adds yet another dimension in that the distance to a structure suitable to receive the effluent from a bypass pumping operation generally exceeds the amount of discharge hose that can be practically connected. In this case, the Utility will call in tank trucks to receive the wastewater and transport around the break to the closest available receiving point. An excavated repair is initiated immediately.

Another emergency specific to a sewer utility is the possibility of an illegal industrial discharge. This type of emergency has been subdivided into three classes of illegal discharges, depending on the severity of the event. Regardless of which type emergency condition presents itself, one of the first activities is an effort to locate the source of the pollution and to insure that its

discharge is discontinued. Once determined, if possible, appropriate enforcement actions will be initiated (in accordance with provisions provided by Ordinance No. 2000-1 – An Ordinance Establishing Uniform Standards for Issuance of Wastewater Discharge Permits).

a) Localized Discharge Contained in a Lift Station

Once containment has been confirmed, a quick analysis is performed to determine if the material is toxic to the wastewater treatment process. If it can be classified more as a nuisance (like a relatively small quantity of oil and grease), the decision may be made to continue normal operation and let the plant treat the material. If the material is deleterious (or even thought to be so), then portable pumps or a vacuum truck will be used to collect the material and load it in a tank truck for proper disposition. If it is ultimately determined that the plant can handle the material, the tank trucks would discharge it to the sludge transfer station at the treatment plant where it will be directed to an isolated tank (the "E" tank) for appropriate treatment.

b) Non-toxic Discharge that Reaches the Treatment Facility

In the event that an illegal discharge reaches the treatment facility, and it is found to be non-toxic to the plant biomass and it doesn't significantly impact the process equipment, then it is allowed to proceed through the process train. If it is determined that dilution is best, it may be temporarily diverted to the "E" tank for controlled release through the process.

c) Toxic Discharge that Reaches the Treatment Facility

In the event of a toxic or equipment impacting discharge, the most important thing is to detect it early so that the water can be diverted to the 1.1 million gallon "E" tank and remain isolated from the main plant flow. If that is successfully achieved, there is time to fully analyze the waste and determine the appropriate treatment and disposal of the material. If it enters the SBR's, then hopefully it will be discovered quickly so that it can be contained in one of the reactor vessels. Again, if it is contained, then it can be handled as above. The worst case occurs when the discharge goes undiscovered and impacts the active plant biomass. At that point, the material has to be properly removed and the startup of the plant reinitiated.

7. Sanitary Sewer Overflow (SSO) Notification

General:

The Town continues to be very proactive in working to prevent releases of sewage into the environment. However, it is not possible to prevent all such events, and therefore, the Town has adopted the Chain of Communication for Reporting Sanitary Sewer Overflows which outlines the following public notification protocol:

a) Contact IDEM and the US EPA, utilizing the "Bypass/Overflow Incident Report", within 24-hours of the event.
b) Contact the Warrick County Health Department, utilizing the same report form, so they can initiate their response protocol.
c) Post sign(s) at the site of a release event immediately upon discovery and confirmation of such an event and leave them up for up to one (1) week after the source of the release has been corrected.

The "Bypass/Overflow Incident Report" will contain the following information:

a) the location of the SSO;
b) the receiving water, if any;
c) an estimate of the volume of the SSO;
d) a description of the sewer system component from which the release occurred, including, but not limited to, manholes, constructed overflow pipe, and pipe cracks;
e) the estimated date and time when the SSO began and stopped or will be stopped;
f) the cause or suspected cause of the SSO;
g) steps taken or planned to reduce, eliminate, and prevent reoccurrence of the SSO and a schedule of major milestones for those steps; and
h) steps taken or planned to mitigate the impacts of the SSO and a schedule of major milestones for those steps.

8. Modeling

General:

One of the most significant tools available to assist in the operation of a modern sewer utility is a computer model. This model facilitates the location of system bottlenecks and the simulation of future improvements and their impact on existing, downstream infrastructure. With this model, it

is possible to predict what will happen to the system when a new development comes on-line or when a significant improvement is made.
Specifically:

The Town of Newburgh commissioned the creation of a sanitary sewer model for their Sewer Utility, which was completed in September of 2001. A computer program known as XP-SWMM 2000 was utilized and the hydraulic model created with the dual purpose of:

a) Simulating flows in the existing system under varying conditions to identify probable causes and solutions to existing problem areas and

b) Evaluating the effect on the sewer system of potential modifications designed to reduce or eliminate existing collection system problems or to provide for future flows.

The SWMM program is a hydraulic model used to simulate flows through networks of links and nodes representing manholes, weirs, pumps, pipes and other elements of a real collection system. It is a dynamic model that can simulate flows at any given time from various sources, including storm water runoff, groundwater, infiltration and domestic, commercial and industrial (DCI) sewage. Generally, only sewers 15 inches in diameter and greater were included in the model.

The result of this effort was the generation of a series of recommendations designed to improve and/or correct current system deficiencies. Since that time, the Town of Newburgh has proceeded with a $4 million dollar improvement project to follow through with the recommendations made in this report.

Inasmuch as significant changes have been, and are currently being, made to the collection system and the fact that the flow metering data, which served as the basis for the 2001 hydraulic model calibration, is now over ten (10) years old, the Town has decided to update the flow metering and system computer model in 2006.

9. Construction Standards

General:

Construction practices in buried utilities are crucial because once the lines are covered it is virtually impossible to check that proper construction techniques were employed. Therefore, two crucial things have to be done to insure that a quality product is installed. The first is the adoption of uniform design and construction standards for the Sewer Utility. The second is a consistent thorough inspection program to insure compliance with those standards.

Specifically:

The Town of Newburgh adopted uniform standards in April, 1997. These standards, entitled "Sanitary Sewer Design and Construction Standards" have been reviewed and updated several times since their initial adoption. The purpose is to establish a protocol for the design and construction of improvements to the Newburgh sewer system. The standards start at the beginning with the approval process for new construction and carry through the formal acceptance of the new infrastructure.

The Town of Newburgh obtained permission through IDEM to issue its own construction permits (pursuant to 327 IAC 3.1). Therefore, the Town's engineering consultant reviews all proposed plans and specifications for conformance with the Town's standards. Authorization to commence construction is not received until the engineer finds the plans acceptable.

One critical component of this process that is often overlooked has to do with the private laterals serving individual residences. Recent data have shown that this pipe can be a major source of I/I unless properly installed. This is where inspection is critical. The Sewer Utility conducts inspections of all house laterals before they are allowed to connect to the system. Additionally, the Utility or its engineering consultant provides inspection services on all new sewer construction. These inspections help insure that the construction standards are met and that a quality product is ultimately accepted by the Town.

D. COLLECTION SYSTEM MAINTENANCE

1. Maintenance Budgeting

General:

The issue of budgeting was covered under the Collection System Operation section. The Town does not segregate their budget between operations and maintenance.

2. Planned and Unplanned Maintenance Program

General:

Maintenance is the key to the continued, long-term success of the utility. Without proper maintenance, service disruptions and even NPDES Permit violations will ultimately occur. Additionally, costs of service will increase because: 1) improperly maintained equipment will not last as long and have to be replaced more frequently, 2) payment of damage claims when there are residential sewage backups, and 3) payment of regulatory fines for permit violations.

The primary goal of this CMOM is to develop a program to help insure optimal operation of the utility.

Specifically:

Routine maintenance for the collection system consists of two basic activities, namely: 1) maintenance cleaning of sewer line sections that are known to have periodic blockage/plugging and 2) lift station maintenance. Relative to the sewers, preventative maintenance consists of a variety of activities outlined on a checklist. Maintenance line jetting is scheduled quarterly and there is a log maintained indicating the areas that require this activity and the dates that it was performed. In addition, a separate log documents the use of the jet cleaning truck and the particular data concerning each cleaning activity. System manholes are targeted for a physical inspection at least every 5 years and a log is kept documenting the activity. Most of the rest of the activities are performed on an as-needed basis.

Lift station maintenance is scheduled on a regular basis. The stations themselves are inspected at least twice each week for general operation and then on a less frequent basis, a more thorough evaluation is made. Based upon these inspections, a history is developed for each lift station in the system. Additionally, there is a pump maintenance log to record all activities specific to the pumps themselves. Relative to the standby power sources located at key lift

stations, all preventative maintenance is handled by an outside contractor. The contract specifies quarterly checks with routine maintenance scheduled every six months.

Unscheduled maintenance, not identified by staff, generally comes in as a customer complaint. The Utility maintains a Complaint Log of every complaint received. The log includes a staff evaluation of the situation and the corrective action to resolve the problem. If the complaint includes a system bypass/overflow event, then the previously referenced incident report is completed and submitted, as appropriate to the regulatory agencies.

Maintenance activity protocols at the wastewater treatment facility, both scheduled and emergency, are covered in detail in the plant O&M Manual which was completely updated and revamped in 2001 at the completion of the most recent plant expansion.

3. Portable Emergency Equipment

General:

There are many tools and lot of equipment needed to properly operate a wastewater collection and treatment utility. This equipment includes items not only to make the physical improvements, but also to insure the safety of the employees.

Specifically:

Proper maintenance requires access to the necessary materials and equipment. The Sewer Utility owns the following maintenance equipment:

a) Truck mounted jet machine capable of discharging 15 gpm at 4,000 psi. This machine is backed up by the trailer mounted jet machine.

b) TV inspection van including main line, tractor propelled color CUES camera and a black and white push camera for laterals.

c) Cable cleaning machine good on lines up to 8" in diameter.

d) Two trailer mounted, diesel pumps. The 6" pump is equipped with a direct drive while the 4" pump is hydraulic. There are also three, 3" trash pumps.

e) Two smoke testing blowers with appurtenances.

f) Backhoe.

The Town has an ongoing agreement with a local sewer contractor to handle any repair work that requires equipment and/or skills beyond the capability of their utility.

4. Sewer Inspection and Cleaning

General:

As previously discussed, the Sewer Utility owns and operates the equipment necessary to perform internal sewer cleaning and conduct televised inspections. The only equipment not owned by the Utility is that necessary for heavy cleaning of larger sewers. If and when this becomes necessary, the Utility retains the services of an outside contractor to perform the work.

Specifically:

Each year, Town employees internally clean and inspect approximately 40,000 feet of sewer lines. In this manner they are constantly monitoring the condition of the lines and targeting appropriate corrective action for problem areas.

Maintenance cleaning is routinely performed on about 50 reaches of sewer due to problems generally associated with root intrusion or grease buildup. In addition to this, cleaning is performed on an as-needed basis.

5. Hydrogen Sulfide Monitoring and Control

General:

The Safety Program section of this document discussed the fact that hydrogen sulfide can be present in the sewer system. This gas is produced by the decomposition of certain sulfur containing materials present in the sewage and in the absence of oxygen. Hydrogen sulfide gas quickly tends to accumulate in the lower sections of the collection system. It smells like rotten eggs and can be detected with a special gas detector.

Specifically:

Generally, hydrogen sulfide (H_2S) gas is produced in long sewage force mains where oxygen depletion occurs. When these force mains discharge into a structure (like a manhole), the gas is stripped and released into the atmosphere creating a dangerous condition for the employees and an often damaging condition to the infrastructure due to the subsequent formation of sulfuric acid.

Once this gas is detected, a preventative program is established to minimize its creation. The first step is to keep the sewer lines as clean as possible to prevent the buildup of sulfur-containing organic material. Additionally, where possible, the oxygen level in the sewage is elevated to prevent the formation of anaerobic conditions. Both of these activities help prevent the creation of the gas in the first place.

In the event that it is not possible to prevent the conditions suitable for gas formation, chemicals are used to create unsuitable conditions for the bacteria involved in the gas creation. The Sewer Utility utilizes three different techniques to help prevent the sewage from going anaerobic, namely: a) The use of a 50% solution of sodium hydroxide (NaOH) for this purpose. This chemical is fed for about two hours while trying to maintain a pH of 11.0 or higher. In cold weather, this treatment helps eliminate the slime growth in sewers for about 6 months, while in summer it may only last for a month. This method is used in areas where there is insufficient space to locate a chemical storage tank. Presently, it is used at the Blue Lake Lift Station. b) The second method utilizes a nitrate compound (Nitro Nox as supplied by Bio Chem). Chemical feed pumps are used to meter the chemical, stored in above-ground tanks, into the lift station wet wells. The dosage is manually adjusted by using an H2S meter to measure gas release at the discharge point of the lift station force main. This technique is presently utilized at the Powers Lift Station and the Old Plant Lift Station. Future plans call for treatment at the Victoria Lift Station as well. c) The third method relies on the creation of super oxygenated water to maintain the desired dissolved oxygen level in the sewage. The system consists of a circulation pump, oxygenation cone, and oxygen storage tank. A portion of the wastewater is super oxygenated to over 70 ppm and then mixed with the rest of the sewage flow. The resulting mixture contains more than 10 ppm of oxygen. This oxygen level is gradually depleted as the wastewater is conveyed in the force main, but the level is such that it does not go anoxic before arriving at its destination.

6. Parts and Equipment Inventory

General:

Adequate maintenance relies on the availability of parts and equipment. If a pump is out and the sewage is building up in the wet well, the employees can't wait to find out where they can obtain the necessary parts to accomplish the repair.

Specifically:

The Newburgh Sewer Utility maintains an extensive spare parts inventory. As a general rule, the Town attempts to maintain backup units for most pumping applications. They also have replacement parts for most critical pieces of equipment. The Town's definition of a critical spare part is one that if it fails it may lead to an overflow or serious operational problem, and the Town

cannot operate without it, and the part cannot be obtained locally within about a 2-hour period, then the Town tries to carry the part in its inventory. Another advantage is that they are situated next to a major metropolitan area with ready access to major parts and repair services.

The Town's lift stations have all been inventoried with regard to basic equipment contents and an extensive parts listing. The parts listing includes items such as bulbs, fuses, motor starters, relays, sensors, heaters, valves, sleeves, impellers, etc. The replacement parts listing includes specific sizes and model numbers for each item as well as the supplier data. The Utility also maintains a complete listing of all parts and supplies in inventory.

E. SEWER SYSTEM CAPACITY EVALUATION

1. Flow Monitoring

General:

The backbone of the wastewater utility is the system of pipes and pumps needed to collect the wastewater and transport it to a centralized location for treatment. This often-complex network of hydraulic components is in a constant state of change. If there isn't growth going on in the system resulting in changes to its loading characteristics, then age alone may affect the carrying capacity and watertightness of the pipe and or the ability of the pumps in the lift station to continue to operate efficiently and effectively. The best way to stay abreast of the changes in the sewer system loading at various points within the network is the use of portable flow meters to check flows experienced in any given section.

Specifically:

In late 1995, the Town of Newburgh commissioned an extensive flow monitoring program throughout their system. The system is comprised of over 800,000 lineal feet of sewer pipe ranging in size from 6" to 24" in diameter. The system was sub-divided into twenty-one (21) sub-systems and portable flow meters were installed simultaneously in all systems. The Town owns four (4) units of their own, and a consultant provided the remainder. Therefore, even after the study was complete, the Town has the capability to install a portable meter as the need arises.

The primary purpose of this effort was to locate infiltration/inflow (I/I) that was entering the system and robbing line capacity or overloading the network. Based upon this work, it was recommended that the Town perform smoke testing, dyed water flooding and internal televised inspections to pinpoint problem areas. The net result after all of this work was a series of improvements that were recommended to help eliminate I/I from the system.

Although not specifically envisioned at the time of this study, the flow data also proved invaluable during the development of the previously referenced computer model of the system. Specifically, the flow data helped in the model calibration and/or verification efforts. As mentioned previously, the Town intends to obtain new flow monitoring data in the spring of 2006.

2. Physical Inspection

General:

One of the best ways to monitor any system is through routine physical inspections. You want staff to see the facilities before there are any problems. In so doing, the Town has a baseline for how the system operates under normal circumstances. It may be that due to the alignment of a certain sewer section, the flow in the manhole appears elevated even though it is due to the physical configuration or a hydraulic anomaly. The first time the staff observes it they will check it out, probably even televising the section. Once satisfied that it is merely a peculiarity of the system, they will know that it is "normal" for that section. Then, at a later date, if different conditions exist, they will know that something is amiss.

Specifically:

As described in previous sections, the Town of Newburgh performs routine physical inspections of the sewers and lift stations. These inspections are scheduled and documented. The documentation should include sufficient pictures and tie down locations so that a condition of concern can be readily located again in the future. The pictures are also useful in explaining the problem to officials to justify the expenditure of funds to correct the situation.

This procedure often provides an early indication that something isn't functioning as it has in the past or as it is supposed to do. Normally, these investigations, after having revealed a potential problem, lead to further investigative techniques designed to help pinpoint the problem. Ultimately, all the information is compiled to identify the problem cause and determine a corrective action.

3. Smoke Testing, Building Inspections, and Dyed Water Flooding

General:

Once a problem is discovered (generally as a result of flow metering or a physical inspection), additional investigation is needed to isolate the nature of the problem. Internal televising is a very time consuming and costly activity. There are a whole host of defects that are not visually apparent. On the TV screen, you may see "lateral" connection to the sewer. On the surface it looks all right, but it may be a direct connection from a downspout. As a general rule, internal televising is useful in locating infiltration sources while the methods discussed in this section are useful in locating inflow sources. That is why other techniques are used. Then, under appropriate circumstances, internal inspection is employed.

Specifically:

Smoke testing is a relatively inexpensive investigative method useful in detecting many inflow sources such as roof leaders; cellar, yard or area drains; foundation drains; abandoned building laterals; faulty lateral connections; sewer cross connections; and structurally damaged and/or leaking joints.

The Newburgh Sewer Utility routinely uses smoke testing to help locate illegal discharges into the sanitary sewer system. The equipment usually required to conduct smoke testing is: 1) air blower, 2) smoke bombs, 3) camera, 4) sewer plugs, and 5) two-way radios. The smoke bombs are non-toxic, odorless and non-staining. The air blower is used to force the smoke through the section of sewer being tested that has been isolated with the plugs. The camera is used to document the smoke coming out of the ground, catch basins, downspouts, etc. Prior to conducting a smoke testing program, the Town notifies all households in the area to be tested. The fire and police departments are notified as well.

Smoke testing is not effective in sewers with sags or that are flowing full because the smoke can't get through. It is also not effective when the soils surrounding and above the pipe are saturated, frozen, or snow covered. Finally it is difficult to utilize this technique on windy days because the smoke dissipates so quickly that it may avoid detection.

Building inspections are most often used to locate floor drains and sump pumps that may discharge into the sanitary sewer. If there are traps on these lines, then smoke testing will not be effective because the smoke is prevented from escaping and therefore being noticed. A building inspection will reveal the existence of either floor drains and/or sump basins. If present, the inspection has to include a determination of the discharge point for these potential inflow sources. The best time to provide this type of inspection is during construction. It is fairly unusual for either a floor drain or sump basin to be added later, so if they are not present when the structure was built, it is unlikely that they will be added later. Additionally, since they are specifically prohibited in the Town's Sewer Use ordinance, the builder can be readily forced to correct the situation at the time the structure is built. Inspections performed well after construction are more difficult since they rely on the owner to be present to obtain entry.

Dyed water flooding is a technique used primarily to detect and/or confirm I/I sources from down spouts, storm sewer sections, and stream sections. It can also be used to confirm smoke testing results. Specifically, fluorescent, biodegradable dyes are used to color water, which is then introduced into the system to confirm a connection. The presence or absence of the dye in a downstream section indicates the I/I potential.

4. Internal Televised Inspections

General:

Internal televised inspection utilizes a specially designed, closed-circuit TV camera to observe the conditions in existing sewer lines. The camera is mounted in a casing and traverses through the sewer from manhole to manhole. Newer equipment includes smaller units capable of inspecting house laterals as small as 4" in diameter. Most set ups allow for still photographs to be taken in addition to the recorded VCR TV images.

Specifically:

The Newburgh Sewer Utility owns and operates its own televising equipment. In fact, they own a van that contains all the equipment needed to accomplish the internal inspection of a sewer reach. Whenever a problem is identified that requires viewing the inside of the sewer, the equipment is employed. Additionally, the Utility tries to proactively inspect non-problem sections to determine general pipe condition. In that manner, they can better predict future problems and plan accordingly.

5. Repair/Rehabilitation

General:

After all the investigative work is complete and the nature of a specific problem identified, then a repair has to be initiated. Sometimes, these repairs represent an emergency that requires immediate action to prevent a threat to the health and safety of the residents. Other times, repair of the defective condition can wait for a more convenient time or when funds have been set aside to accomplish the correction. Proper operation of a sewer utility anticipates that both categories of activities will occur and prepares accordingly as described in the previous sections of this document.

Specifically:

All the previous sections of this report document the procedures and equipment that the Newburgh Sewer Utility utilizes in the event of a problem in the system. Known problems are either handled immediately or scheduled as a part of the annual repair program. If the scope of the repair is beyond the capability of the utility, an outside contractor is engaged to perform the repair. Larger projects require engineer prepared plans and specifications followed by public bidding. Emergencies are handled immediately and an outside contractor called in as necessary.

Non-emergency projects are brought before the Utility Committee for approval and submission to the Town Council of the Town of Newburgh for authorization. In the event of an emergency, the Town Council representative on the Utility Committee is advised and may provide guidance on proceeding with the work. As necessary, an emergency meeting of the Town Council can be held to authorize a repair if it is beyond the authorization capacity of the Town Council representative on the Utility Committee.

F. PROGRAM SUMMARY

CMOM is an acronym that stands for capacity, management, operation, and maintenance. The purpose of CMOM is to formulate a detailed program to insure the proper construction and operation of a public wastewater utility. The focus of the program is on the wastewater collection system but includes the treatment component as well. This document details all the components of the Town of Newburgh's sewer utility in terms of physical plant, managerial programs, and operational activities.

Although this US EPA program initiative is relatively new, it is apparent that the Town of Newburgh has been proactive in its approach to operating its utility as evidenced by the fact many of the program components have been routinely performed by the Town for decades. The biggest benefit of this program is that it required the Town to thoroughly document protocols and procedures in an organized, easily usable format.

The election to store this data on an electronic medium allows the Town to maintain most of the pertinent procedures and forms in one place and on one computer compact disc. With disc copies readily available, any elected Town of Newburgh official or authorized staff member can locate desired information such as system mapping, rate and use ordinances, or procedural protocols. Not only is this a useful tool today, but it will be increasingly valuable in the future as we proceed further into the paperless, electronic storage age.