Energy Management System Manual Wastewater Treatment Utility

A Supplement to the EPA Energy Management Guidebook for Drinking Water and Wastewater Utilities (2008)

PREPARED BY GLOBAL ENVIRONMENT & TECHNOLOGY FOUNDATION (A 501(C)(3) NOT-FOR-PROFIT)
IN PARTNERSHIP WITH INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT,
AND THE U.S. ENVIRONMENTAL PROTECTION AGENCY
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Foreward

This example energy management system manual for a wastewater treatment utility was developed as a supplement to the EPA's Energy Management Guidebook for Drinking Water and Wastewater Utilities (Guidebook). The manual was prepared by Global Environment Technology Foundation (GETF) during the Indiana Energy Management Pilot that took place from 2009 to 2011. The name, Clearville is fictional as are all the names and data in the manual. It is however based on quantities and ideas from the Pilot. A similar manual was prepared for a drinking water utility.

Energy management requires a positive environment where utilities can work toward clear objectives. It is anticipated that these short guides will be a useful supplement to the Guidebook for any water utility

City of Clearville

Energy Management System Manual

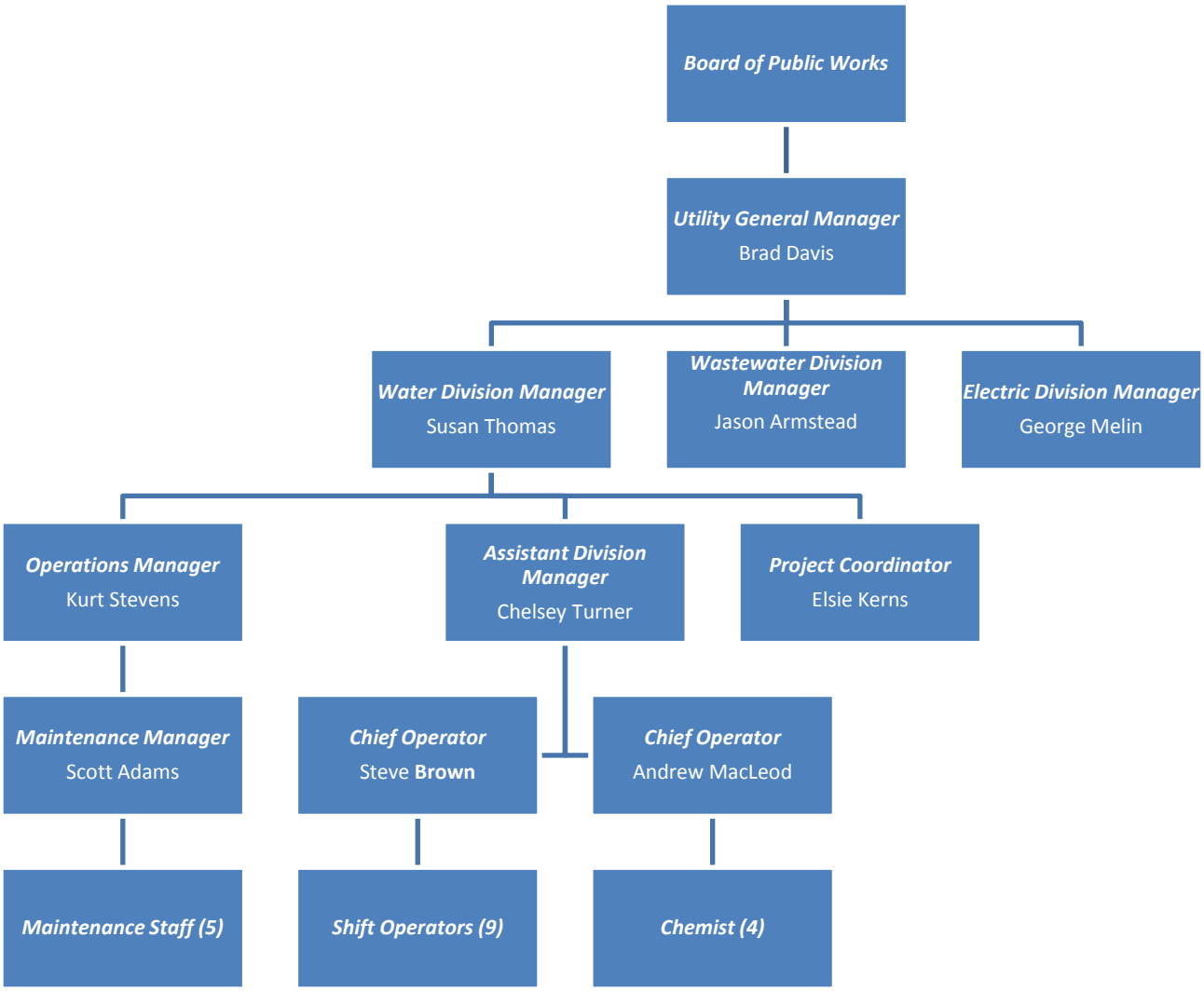
CCWTP

Clearville Wastewater

CONTENTS

UTILITY PROFILE: CLEARVILLE WASTEWATER TREATMENT PLANT:

The Clearville Wastewater Treatment Plant (CWWTP) is located in western Indiana, serves a population of about 50,000 residents and has 28 full-time employees.



CWWTP has a design average of 20 MGD, with a peak of 42 MGD. In 2010 the average flow was 10.3 MGD, the peak flow was 58.8 MGD. The plant holds a regional Air Quality air permit, a land application permit, National Pollution Discharge Elimination System (NPDES) permit, and a stormwater permit.

CLEARVILLE WWTP ENERGY POLICY:

In these times of financial strain on municipalities, efforts to control and contain costs are a city-wide priority, as is the popular and political will to become more "green". These realities were the basis for the Clearville Wastewater Treatment Plant's Energy Policy. Our energy policy serves as a commitment and a guide for improving our energy performance, and it is available to all employees, contractors, and the public on the Clearville City website.

Clearville Wastewater Treatment Plant (CWWTP) is committed to compliance and to continual improvement of its energy efficiency. CWWTP will implement effective energy management programs that support all operations and customer satisfaction while providing a safe and comfortable work environment.

It is the mission of the Clearville Wastewater Treatment Plant to promote sound energy management practices while ensuring outstanding treatment efficiency. We commit to tracking our energy use, to achieving reductions in energy use and costs, and to creating a culture of energy awareness and conservation.

Related Documents:

- Clearville WWTP Energy Policy (Document # En-002)

ENERGY MANAGEMENT SYSTEM FENCELINE:

The Wastewater Treatment Plant located at 875 Adams Way West. Everything within the physical fence boundary of the utility is part of our Energy Management System and is called our energy Fenceline.

ENERGY MANAGEMENT SYSTEM TEAM MEMBERS:

The Energy Management Team has primary responsibility for our Energy Management System. The Team was established as a new group within the utility. Our key to building an effective Team was to involve all levels of the utility and to hold regular meetings. Our Team meets bi-weekly, and members include:

- Wastewater Division Manager (Senior Manager liaison)
- Wastewater Asst. Div. Manager (Team Leader)
- Operations Manager
- Maintenance Manager
- Chief Operators (union liaison)
- Project Coordinator (Recorder)
- Maintenance Technician (union liaison)

SIGNIFICANT ENERGY USING ACTIVITIES:

In order to develop a list of our significant energy using activities, the Energy Team considered all of the operations, activities, processes, materials, wastes, as well as the results of a baseline energy evaluation of our fenceline. The baseline energy evaluation included the following activities: a field audit (also called walkthrough audit) of all fenceline buildings and sites for a preliminary assessment of our energy use; tracking of monthly and annual energy use; developing an equipment inventory and demand of distribution and energy. Additionally, we relied on diagnostic tools such as Portfolio Manager, on the results of process mapping, and on notes gathered during the walkthrough or field audit of all the activities and operations in the fenceline. We considered Water and/or wastewater flows; electricity data including overall electricity consumption (kWh) as well as peak demand (kW) and load profiles where available. We also considered design specifications and operating schedules.

The Energy Team ranked all energy consuming processes using the following criteria:

- ✓ Frequency of use,
- ✓ Potential energy savings,
- ✓ Cost of implementing improvements, and
- ✓ Intensity of energy use.

The composite ranking score was then used to prioritize the most significant areas.

CWWTP maintains a procedure (Document # En - 003) that describes how we determine which activities and operations have significant energy impacts and a List of Significant Energy Using Activities (Document # En-003.2).

Related Documents:

- Significant Energy Using Activities Procedure (Document # En-003)
- Process Map (Document # En-003.1)
- Ranking Spreadsheet (Document # En-003.2)
- List of Significant Energy Using Activities (Document # En-003.3)
- Clearville Energy Policy (Document # En-002)

ENERGY REDUCING OBJECTIVES AND TARGETS:

Objectives, targets, and action plans established by CWWTP are designed to improve energy efficiency, reduce cost, and increase awareness and understanding of the energy impacts of utility activities and operations among our staff, vendors, and contractors. Our objectives are defined as internal goals our facility establishes to improve energy performance. A target is a measurable performance improvement that arises from our objectives. A Performance Indicator is a measurement tool that we use to evaluate and measure energy performance in relation to a specific target. An action plan is a structured program with a set of specific identifiable actions that provides direction for achieving and tracking objectives and targets. Action Plans assign tasks, resources, responsibilities, and timeframes for achieving objectives and targets.

For each objective and target, CWWTP develops an action plan that identifies responsible staff and the means and the time frame for achieving the target. When the energy objectives and targets are established or reviewed, the following items are considered:

- Clearville Energy Policy
- Significant Energy Using Activities
- Legal and Other Requirements

CWWTP maintains a procedure (Document # En-005) that describes how we identify our Objectives and Targets, Performance Indicators, and develop associated Action Plans.

Related Documents:

- Clearville Energy Policy (Document #En-002)
- Objectives and Targets and Action Plans (Document # En-005)
- Sample Action Plan (Document # EN-005.1)
- List of Significant Energy Using Activities (Document #En-003.2)
- Legal and Other Requirements (Document #En-009)

OPERATIONAL CONTROLS:

CWWTP documents operational controls (also called SOPs or work instructions) to improve the reliability and consistency of tasks associated with compliance and associated with activities and operations that have significant energy impacts. In general, operational controls provide an easily available reference for employees in all shifts and are invaluable for training new employees and part-time help. Moreover, operational controls also allow for better emergency preparedness.

CWWTP maintains a procedure (Document # En-004) that describes how we develop operational controls and identify which we will document.

Related Documents:

- List of Significant Energy Using Activities (Document #En-003.3)
- Operational Controls (Document # En-004)
- Sample Operational Control (Document # En-004.1)

TRAINING:

CWWTP ensures that all employees, contractors and vendors are aware of the Energy Policy. Furthermore, we ensure that those employees whose daily job duties are associated with our Significant Energy Using Activities and who have the potential to affect our energy efficiency and usage are properly qualified, and adequately trained.

CWWTP maintains a procedure (Document #En-006) to identify who will receive competency and awareness training, the level of training needed, and a schedule and plan to deliver the training and maintain training records.

Related Documents:

- Competency and Awareness Training Procedure (Document #En-006)
- Energy Policy (En-002)
- List of Significant Energy Using Activities (Document #En-003.2)

COMMUNICATION:

CWWTP maintains clear and frequent communication practices about the procedures, requirements, and strategies associated with our energy management system. Internal communication focuses not only on keeping employees within the utility up-to-date on any changes to operations and activities that will improve our energy performance, but also encouraging a two-way process to exchange information, ideas, and opinions on additional ways to become more energy efficient. We want all of our employees, contractors, vendors, and other internal stakeholders to be aware of our Energy Policy and our energy improvement goals, and our energy saving progress and benefits.

External communication focuses on establishing and maintaining confidence and understanding among those external parties who have an interest in the energy efforts we are making and who have an impact on the functioning of our organization. We also communicate data about our energy efforts in our Annual Report, and we provide regular energy updates to our Mayor and Board of Public Works. These are used by the Mayor to draft the State of the City Address.

CWWTP maintains a procedure (Document # En-007) that describes how we develop internal and external communication materials and communication plans.

Related Documents:

- Communication (Document #En-007)

CONTROLLING DOCUMENTS AND MANAGING RECORDS:

The primary purpose of CWWTP's document control activities is to ensure that only current documents are employed in our daily operations and activities, and particularly in our energy management system. We

also want to ensure that our documents can be easily located, periodically reviewed, updated and replaced with current versions as needed, and removed when obsolete.

With respect to records, our intent is that records necessary to manage and maintain the energy management system as well as those that are required by law are current, easily accessible, protected, and archived when necessary.

CWWTP maintains a procedure (Document # En-006) that describes how we manage and control documents and records associated with the Energy Management System

Related Documents:

- Document Control (Document #En-008)
- Hierarchy of Energy Management Documentation (Document #En-008.1)

LEGAL REQUIREMENTS AND COMPLIANCE STATUS:

CWWTP is committed to conducting utility operations and managing resources in compliance with all applicable environmental laws and regulations and in an environmentally sensitive manner.
In order to ensure that CWWPT operations comply with all applicable legal and other requirements, the Energy Team has identified ways in which information about legal and other requirements applicable to our operations and activities is received, kept up-to-date, and communicated.
CWWTP maintains a procedure (Document # En-009) that identifies the roles and responsibilities utility staff has in gathering, updating, and communicating information on applicable laws and regulations.

Related Documents:

- Legal Requirements and Compliance Status (Document #En-009)

MONITORING AND MEASUREMENT:

CWWTP regularly evaluates the key characteristics of our energy management system including: measuring energy consumption and performance, especially as it relates to significant energy using activities; maintaining the efficiency of energy using equipment; regularly reviewing progress in achieving energy improvement goals; verifying conformance with operational controls, and evaluating regulatory compliance. Results of monitoring and measuring activities us identify areas of the energy management system which are performing well and where there may be opportunities for improvement.

CWWTP maintains a procedure (Document # En-010) that identifies the roles and responsibilities associated with monitoring and measuring the key characteristics of our Energy Management System.

Related Documents:

- Monitoring and Measurement (Document #En-0010)
- Objectives and Targets and Action Plans (Document # En-005)
- Legal Requirements and Compliance Status (Document #En-009)
- Energy Policy (En-002)

- List of Significant Energy Using Activities (Document #En-003.2)
- Operational Controls (Document # En-004)
- Communication (Document #En-007)

CORRECTIVE ACTION:

Part of the process of working within and using an Energy Management System is identifying when and where there is nonconformity with the operation, implementation or maintenance of the system. CWWTP identifies and deals with nonconformities in order to minimize any negative impacts to the environment or to our energy improvement plans.
CWWTP maintains a procedure for identifying and dealing with nonconformities, determining the root cause, providing appropriate corrective and preventive actions, reviewing the effectiveness of the corrective and preventive actions taken, and recording the results. The procedure also ensures that any necessary changes are made to energy management system documentation.

Related Documents:

- Corrective Action (Document #En-011)

MANAGEMENT REVIEW:

Management Review provides CWWTP an opportunity to review the quantitative and qualitative benefits realized through our energy management system. During the review, senior management assesses the suitability, adequacy, and effectiveness of the system. The review provides CWWTP an opportunity to make any needed course corrections, and prepare to set new objectives and targets for continued energy improvements.

CWWTP maintains a procedure (Document #En-012) for management review that includes assessing opportunities for improvement and the need for any associated changes, as well as a review of the Energy Policy and objectives and targets. Meeting minutes from the management reviews document accomplishments, decisions, action items, recommendations, and future focus.

Related Documents:

- Management Review (Document #En-012)

APPENDIX: SYSTEM DOCUMENTS REFERENCED IN THIS MANUAL

Energy Policy (Document # En-002)
Significant Energy Using Activities Procedure (Document # En-003)
Process Map (Document # En-003.1)
Ranking Spreadsheet (Document # En-003.2)
List of Significant Energy Using Activities (Document # En-003.3)
Operational Controls (Document # En-004)
Sample Operational Control (Document # En-004.1)

Objectives, Targets and Action Plans (Document # En-005)
Sample Action Plan (Document # En-005.1)
Sample Action Plan (Document # En-005.2)
Basis for Selecting Objectives and Targets (Document # En-005.3)
Competency and Awareness Training (Document #En-006)
Communication (Document # En-007)
Document Control (Document # En-008)
Hierarchy of Documents (Document # En-008.1)
Legal and Other Requirements and Compliance Status (Document # En-009)
Monitoring and Measurement (Document # En-010)
Corrective Action (Document # EN-011)
Corrective Action Request (Document # EN-011.1)
Management Review and Communicating Success (Document # En-012)

CLEARVILLE ENERGY POLICY

Subject:	**Clearville Energy Policy**	**Document No:**	**En-002**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.16.2010**

Scope

This policy applies to all persons who work for or on behalf of the Clearville Wastewater Treatment Plant.

Clearville Wastewater Treatment Plant (CWWTP) is committed to compliance and to continual improvement of its energy efficiency. CWWTP will implement effective energy management programs that support all operations and customer satisfaction while providing a safe and comfortable work environment.

It is the mission of the Clearville Wastewater Treatment Plant to promote sound energy management practices while ensuring outstanding treatment efficiency. We commit to tracking our energy use, to achieving reductions in energy use and costs, and to creating a culture of energy awareness and conservation.

References

CLEARVILLE WASTEWATER TREATMENT PLANT

IDENTIFYING SIGNIFICANT ENERGY USING ACTIVITIES

Subject:	Priority Energy Using Activities And Operations	Document No:	En-003
Approved By:	Jason Armstead	Date Issued:	11.17.10

Purpose

The purpose of this procedure is to capture how CWWTP identifies the energy using activities and operations within its fenceline. Utilities can then prioritize the activities and operations that are most likely to affect the plant's energy usage based on selected criteria. This prioritization process enables CWWTP to determine which activities and operations should be addressed first to improve energy efficiency and reduce energy wastes.

Scope

This procedure applies to all persons who work for or on behalf of the CWWTP when engaged in utility work-related activities associated with the energy management system.

Definitions

Fenceline: where in the utility the organization will be applying the energy management system

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
The Energy Team	Annually identify the activities and operations to include in the energy management system. Typically, the fenceline is the physical boundary of the treatment plant.
The Energy Team	Flow chart each step of the plant's operation, like pretreatment and biosolids. List all of the activities within each operation that use energy as an "input," like pumps or motors. Create a separate flow chart for each step of the plant operation.
The Energy Team	Transfer all of the "inputs" listed on the flow charts to a ranking spreadsheet (Document # En-3.5). Label the top of the inputs column as "Activity." Then label the next column as "Operation" and list the flow chart page, or operation, in which each input is derived, like pretreatment or biosolids.

ACCOUNTABILITY	RESPONSIBILITY
The Energy Team	Determine criteria to rank or prioritize each of the inputs. CWWTP criteria include: frequency of use, potential for energy savings, cost of implementing energy savings, and energy intensity. Add a column to the spreadsheet for each criterion selected.
The Energy Team	Identify the numerical ranking system used for each of the rating criteria developed. CWWTP uses the following system: 1 = low; 3 = medium; 5 = high.
The Energy Team	Using the numerical rating system and rating criteria previously developed rate each of the energy using inputs and record this number in the spreadsheet. Determine the significant energy inputs by multiplying the rating of each row for a total score. Record this total score in a new spreadsheet column labeled "Total Score."
The Energy Team	CWWTP uses a threshold score of 45, at or above which the activity or operation is considered a significant energy using activity. Significant energy using activities are listed on Document # En-003.6. List these on a separate document.
The Energy Team	Communicate information about the significant energy using activities as described in the Communication Procedure (Document # En-007)

References

Process Maps (Document # En-003.1, 003.2, 003.3, 003.4)
Ranking Spreadsheet (Document # En-003.5)
List of Significant Energy Using Activities (Document # En-003.6)
Communication Procedure (Document # En-007)

CLEARVILLE WASTEWATER TREATMENT PLAN

SAMPLE PROCESS MAP

Subject:	**Sample Process Map – Headworks (Step 1)**	**Document No:**	**En-003.1**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**

Inputs →

Screening – motors (4), gear drive for screw conveyor, compactor
Scum concentrator – 2 motors, 1 pump
Raw sewage pumps (7)
Grit classifiers (2)
Dumpster conveyor – 1 motor
Classifier motors (2)
Crane – 2 ton hoist
Ventilation system – 5 air handling units, 1 exhaust fan, 4 roof fans, 2 odor control fans
Lighting

Activities

Headworks (Step 1)

Remove solids from influent wastewater greater than 4 mm in dimension
Elevate wastewater into treatment plant
Wash and compact screenings
Wash and dewater grit
Deodorize air using carbon filter

Outputs →

Screened Wastewater

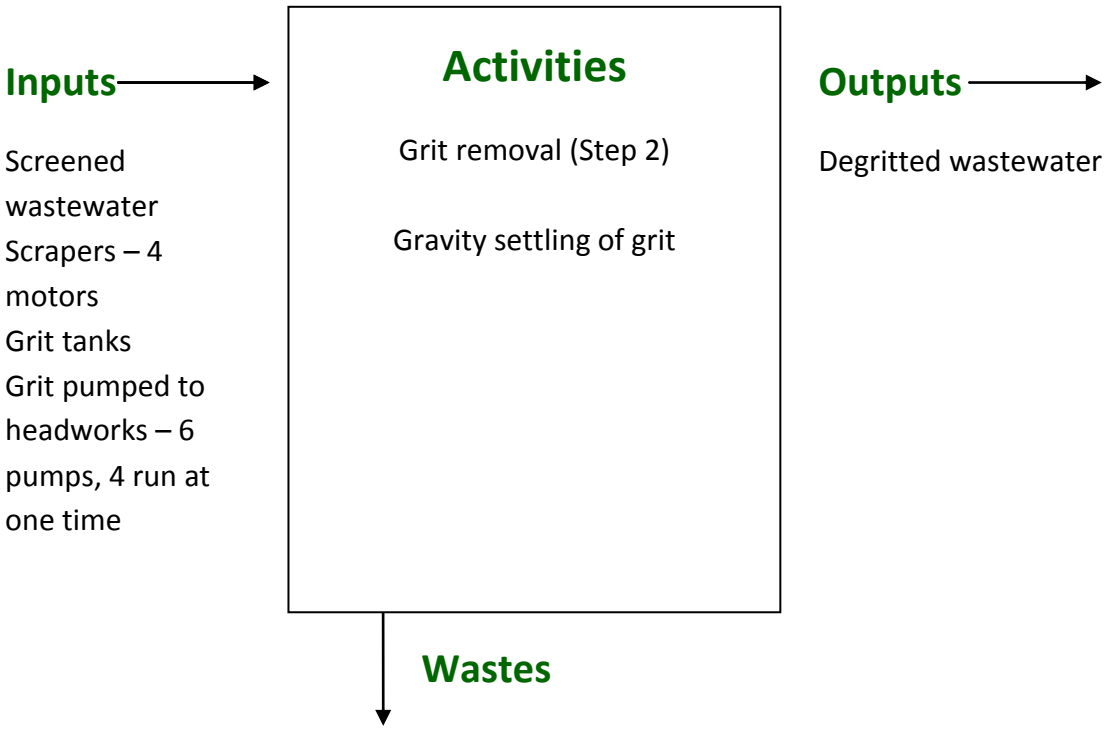
↓ Wastes

Screenings – landfilled
Grit – landfilled
Scum – landfilled

CLEARVILLE WASTEWATER TREATMENT PLAN

SAMPLE PROCESS MAP

Subject:	**Sample Process Map: Grit Removal Step 2**	**Document No:**	**En-003.2**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**



CLEARVILLE WASTEWATER TREATMENT PLAN

SAMPLE PROCESS MAP

Subject:	**Sample Process Map: Primary Clarification (Step 3)**	**Document No:**	**En-003.3**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**

Inputs →

Clarifiers – 6
Electric motors – 9
Automated scum removal on east plant – 4 motors
Scum grinder – 3 motors
Primary sludge pumps – 5

Activities

Primary Clarification (Step 3)

Gravity settling of settleable solids

Flotation of buoyant solids

Removal of both

Outputs →

Primary effluent

↓ **Wastes**

CLEARVILLE WASTEWATER TREATMENT PLAN

SAMPLE PROCESS MAP

Subject:	**Sample Process Map: Activated Sludge (Step 4)**	**Document No:**	**En-003.4**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**

Inputs →

Air – electric blowers (5)
FeCl – pumps
Peristaltic pumps – 7, 4 run at a time
Recirculating pumps – 2 RAS

Activities

Activated sludge (Step 4)

Conversion of biodegradable organic matter into cell mass and respiration byproducts

Conversion of soluble phosphorous into a solid phosphorous complex

Outputs →

Mixed liquor

Wastes ↓

CLEARVILLE WASTEWATER TREATMENT PLAN

RANKING SPREADSHEET FOR PRIORITY ENERGY USING ACTIVITIES

Subject:	**Ranking Spreadsheet to Identify Priority Energy Using Activities**	**Document No:**	**En-003.5**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**

Activity	Operation	Freq of Use	Potential Energy Savings	Cost of Imp Energy Savings	Energy Intensity	Total Score
Boilers – natural or digester gas (2)	Miscellaneous activities	5	3	5	5	375
Air chiller unit	Miscellaneous activities	3	5	1	5	75
RAS pumps – 8, 6 used at a time	Final Primary clarification	5	3	1	5	75
Refrigerator – 6	Miscellaneous activities	5	5	3	1	75
Electric Motors – 9	Primary classification	5	3	3	1	45
Grit pumped to headworks – 6 pumps, 4 run at one time	Grit removal	5	3	1	3	45
Grit tank drive motors – 4	Grit removal	5	3	3	1	45
FeCl recirculating pumps – 2	Activated sludge	5	3	3	1	45
Cl2 recirculation pumps – 2	Chlorination/dechlorination	5	3	3	1	45
Reuse water system pumps – 5	Miscellaneous activities	5	3	1	3	45
Scraper arms – 6 drive units	Final Primary clarification	5	3	3	1	45
Vending machines	Miscellaneous activities	5	3	3	1	45
Ventilation system – 5 air handling units, 1 exhaust fan, 4 roof fans, 2 odor control fans	Headworks	5	3	1	3	45
WAS pumps – 4, 2 run at one time	Final Primary clarification	5	3	1	3	45
Air conditioner – plant	Miscellaneous activities	3	3	1	3	27
Air – electric blowers (5)	Activated sludge	5	1	1	5	25
Clarifiers – 6	Primary clarification	5	5	1	1	25
Raw sewage pumps (7)	Headworks	5	1	1	5	25
FeCl feed pumps – 7	Activated sludge	5	1	3	1	15

Activity	Operation	Freq of Use	Potential Energy Savings	Cost of Imp Energy Savings	Energy Intensity	Total Score
pumps, 4 at a time						
Fume hoods – 7	Miscellaneous activities	3	5	1	1	15
Lighting	Miscellaneous activities	5	3	1	1	15
Mixers – 6 motors	Anaerobic digestion	5	1	1	3	15
Primary and secondary heat loops	Miscellaneous activities	5	1	1	3	15
Screening – motors (4), gear drive for screw conveyor, compactor	Headworks	5	1	1	3	15
Scum concentrator – 2 motors, 1 pump	Headworks	5	1	3	1	15
Sludge circulation pumps – 3, 2 used at one time	Anaerobic digestion	5	1	1	3	15
Wash water pump – 2	Sludge thickening	5	1	3	1	15
Air compressor	Sludge thickening	3	1	3	1	9
Electronic equipment	Miscellaneous activities	3	1	3	1	9
Primary sludge pumps – 5	Primary clarification	3	1	1	3	9
Scum pumps – 2	Final Primary clarification	3	1	3	1	9
Sludge feed pumps – 3	Anaerobic digestion	3	1	1	3	9
Air handling unit – 1	Anaerobic digestion	5	1	1	1	5
Classifier motors (2)	Headworks	5	1	1	1	5
Drive units – 2	Sludge thickening	5	1	1	1	5
Exhaust air fan – 1	Anaerobic digestion	5	1	1	1	5
Hot water circulation pumps – 2	Anaerobic digestion	5	1	1	1	5
Polymer pump	Sludge thickening	5	1	1	1	5
RO system	Miscellaneous activities	5	1	1	1	5
Scum grinder – 3 motors	Primary clarification	5	1	1	1	5
Sodium bisulfate – peristaltic pumps (3), 2 used at a time; water champs (2)	Chlorination/dechlorination	5	1	1	1	5
Sodium hypochlorite – peristaltic pump – (4) use 2 at one time; water champs (2)	Chlorination/dechlorination	5	1	1	1	5

Activity	Operation	Freq of Use	Potential Energy Savings	Cost of Imp Energy Savings	Energy Intensity	Total Score
Thickened sludge pumped to digester – 2 pumps	Sludge thickening	5	1	1	1	5
Heat exchanger pump – 1	Anaerobic digestion	1	1	3	1	3
Flight mixers – 2	Anaerobic digestion	1	1	1	1	1
Rotor valves plant wide	Miscellaneous activities	1	1	1	1	1
Potable hot water heater	Miscellaneous activities	0	0	0	0	0

Definitions of Ratings:

Frequency of Use:

1= Infrequent Use (<1/day)

3= Moderate Use (>1/day)

5= Frequent Use (24 hrs/day 7 days/week)

Potential for Energy Savings:

1 = Little Potential (1%-5%)

3= Potential (6%-25%)

5= Significant Potential (>25%)

Cost of Implementing Energy Savings:

1= Significant Cost (>$10,000)

3= Moderate Cost (<$10,000)

5= No or very low cost (<$50)

Energy Intensity:

1= Low Intensity

3= Moderate Intensity

5= High Intensity

Significance: Determined by multiplying each row. Activities and operations with a total score of 75 or above are considered Significant Energy Using Activities.

CLEARVILLE WASTEWATER TREATMENT PLAN

LIST OF SIGNIFICANT ENERGY USING ACTIVITIES

Subject:	**List of Significant Energy Using Activities**	**Document No:**	**En-003.6**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**

ACTIVITY	OPERATION
Boilers – natural or digester gas (2)	Miscellaneous activities
Air chiller unit	Miscellaneous activities
RAS pumps – 8, 6 used at a time	Final Clarification
Refrigerator - 6	Miscellaneous activities

CLEARVILLE WASTEWATER TREATMENT PLANT

OPERATIONAL CONTROLS

Subject:	**Management Review**	**Document No:**	**EN-004**
Approved By:	**Jason Armstead**	**Date Issued:**	**8.27.11**

Purpose

This procedure describes how Cranford Water develops operational controls and identifies which we will document.

Scope

This procedure applies to all persons who work for or on behalf of the CWWTP when engaged in utility work-related activities associated with the energy management system.

Definitions

Operational control: Detailed instructions for performing a task or for following a procedure; also called a work instruction, operating control, or standard operating procedure (SOP).

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
Energy Team	Identify critical operations on the List of Significant Energy Using Activities.
Chief Operators Maintenance Manager	For each critical operation or activity identified above, work with **Utility Staff** to identify the essential equipment for the operation or activity and document how the equipment will be sufficiently monitored, calibrated, and maintained.
Chief Operators Maintenance Manager	Collect information about how each critical operation and activity is being conducted. Review possible legal requirements and progress in achieving energy improvement targets.

ACCOUNTABILITY	RESPONSIBILITY
Chief Operators Maintenance Manager	Identify which operational controls to document. Draft text for the operational control and verify that each operational control contains sufficient information to identify who, what, when, where, why, and how so that each operation will be conducted consistently across the water utility. **Chief Operators and Maintenance Manager** give the operational control drafts to the **Project Coordinator**.
Project Coordinator	Documents the operational controls and sends them to the **Chief Operators and Maintenance Manager** who schedule competency training as needed.
Energy Team	Master files of each operational control are stored in the **Chief Operators and Maintenance Manager offices**. Copies of relevant operational controls are placed in strategic locations for easy access by staff performing the activity or task.
	Chief Operators and Maintenance Managers monitor conformance to critical operations, activities, and equipment and verify that operational controls are being implemented properly.

References

List of Significant Energy Using Activities (Document No. EN 003.6)
Document and Record Control (Document No. EN -008)
Sample Operational Control (Document No. EN -004.1)
Competency and Awareness Training (Document No. EN -006)
Monitoring and Measurement (Document No. EN -010)
Corrective Action (Document No. EN -011)

CLEARVILLE WASTEWATER TREATMENT PLANT

MONITORING OPERATION OF THE TURBLEX AERATION SYSTEM (SAMPLE OPERATIONAL CONTROL)

Subject:	**Management Review**	**Document No:**	**EN-004.1**
Approved By:	**Jason Armstead**	**Date Issued:**	**8.27.11**

Purpose

This document describes the procedure to monitor operation of the Turblex Aeration System for the purpose of maximizing treatment and minimizing energy consumption.

Scope

The Operator in Responsible Charge is responsible for making certain that the operating parameters of the aeration system are monitored at least twice daily.

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
ORC as designated by the Maintenance Manager	Conduct the inspection and record information from the MCP & LCP, as noted on "Blower Data Log Sheet".
ORC	Inspect the blower to ensure proper operation.

Definitions

MCP: Master Control Panel (found on the 1st Floor of the Blower Bldg)
LCP: Local Control Panel (found at each blower in the Basement of the Blower Bldg)
AV: Air Valve (found at each aeration tank)
ORC: Operator in Responsible Charge

CLEARVILLE WASTEWATER TREATMENT PLANT

OPERATIONAL CONTROLS

Subject:	**Management Review**	**Document No:**	**EN-004.2**
Approved By:	**Jason Armstead**	**Date Issued:**	**5.27.11**

LIST OF OPERATIONAL CONTROLS TO DOCUMENT (ENERGY-RELATED)

The Clearville WWTP has identified portions of the treatment process that provide opportunities for energy reduction and will benefit from having defined operational controls. These treatment processes include:

1. Pumping
    a. Flow Equalization
        i. Operational control will help clarify utilization of flow equalization basins and what considerations need to be taken before altering use of flow equalization.
        ii. Aeration pumping improvements and a recent operational audit may potentially modify the current flow equalization strategy. An interim operational control will be developed.
    b. Influent Pumping
        i. Operational control will define the strategy to balance pumping efficiency and treatment efficiency.
        ii. Influent pump controls have just been installed, and operational controls will not be developed until WW staff has had sufficient time to familiarize themselves with the system, and have been able to adjust the system to match treatment objectives.
2. Aeration
    a. Flow Equalization
        i. Operational control will define when equalization blower will operate, and operational changes that will take place during the operation of the equalization blower.
    b. Aeration
        i. Operational control will define the general operation of the biological treatment unit aeration system.
        ii. The aeration system has just been installed, and operational controls will not be completely developed until WW staff has had sufficient time to familiarize themselves with the system, and have been able to adjust the system to match treatment objectives.
    c. Digester
        i. Operational control will define the condition of operating the digester blower(s).

ii. A recent operational audit has recommended modifying the use of the digester blower system. As such, formal operational controls will not be developed until WW staff has been able to verify the operational recommendation works.

CLEARVILLE WASTEWATER TREATMENT PLANT

OBJECTIVES AND TARGETS AND ACTION PLANS SYSTEM PROCEDURE

Subject:	**Objectives and Targets and Action Plans**	**Document No:**	**En-005**
Approved By:	**Jason Armstead**	**Date Issued:**	**12.17.10**

Purpose

This procedure describes how CWWTP establishes objectives, targets, performance indicators and action plans related to energy efficiency for its fenceline operations.

Scope

This procedure applies to all persons who work for or on behalf of the CWWTP when engaged in utility work-related activities associated with the energy management system.

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
The Energy Team	Annually review the list of significant energy using activities (Document # En-003.6) as you consider what objectives and targets to set. Also consider CWWTP's Energy Policy and Legal and Other Requirements.
Project Coordinator	Document a list of proposed energy objectives and targets.
The Energy Team	Solicit input from utility staff and senior management to ensure that objectives and targets are realistic, appropriate, and achievable. Identify the Performance Indicators you'll use to track your quantitative and qualitative benefits
Wastewater Division Manager	Confirm Senior Management approval of the objectives and targets.

ACCOUNTABILITY	RESPONSIBILITY
Maintenance Manager Chief Operator	Develop action plans for each target. Confirm that the plans identify the individual tasks (what and how will you do it); assign responsibility for completing the tasks and achieving the targets (who will do it?); establish deadlines (by when?) for individual tasks; and estimate staff time and costs (how much?).
Wastewater Assistant Division Manager	Review progress on completing the action plans quarterly or wherever it is possible to link the review to an existing organizational process such as budget, planning or auditing cycles.
The Energy Team	Identify and oversee implementation of any needed course corrections using the Monitoring and Measurement (Document # En-010) and Corrective Action (Document # En-011) Procedures.
The Energy Team	Track progress and communicate the results using the Communication Procedure (Document # En-007)

Definitions

Objective: The internal goal our facility establishes to improve its energy performance

Target: A measurable performance improvement that arises from our objective.

Performance Indicator: A measurement tool that can be used to evaluate and measure energy performance in relation to a specific target.

Action Plans: A structured program with a set of specific identifiable actions that provides direction for achieving and tracking objectives and targets. Action Plans assign tasks, resources, responsibilities, and timeframes for achieving your objectives and targets.

References

Monitoring and Measurement System Procedure (Document # En-010)
Communication Procedure (Document # En-007)
Corrective Action Procedure (Document # En-011)
List of Significant Energy Using Activities (Document # En-003.3)
Clearville Energy Policy (Document # En-002)
Legal and Other Requirements and Compliance Status (Document # En-009)

CLEARVILLE WASTEWATER TREATMENT PLAN

OBJECTIVES, TARGETS AND ACTION PLANS

Subject:	**Energy Improvement Objective #1 Objective, Target and Action Plan**	**Document No:**	**EN-005.1**
Approved By:	**Jason Armstead**	**Date Issued:**	**11.30.2010**

Energy Improvement Objective #1

Activity: Boilers – natural or digester gas (2)
Operation: Miscellaneous activities
Objective: Reduce natural gas usage in boilers
Target: Reduce natural gas usage by 5% by December 31, 2011

Action Plan

Tasks	Responsible Party	Timeframe	Performance Measures	Comments
Develop baseline	Scott Adams	Completed	Monthly ft3 usage	
Experiment with primary loop flow	Scott Adams	31-Aug-11	Monthly ft3 usage	
Implement new operational process	Maintenance Staff	31-Aug-11	Monthly ft3 usage	
Measure natural gas usage reduction	Maintenance Staff	30-Sep-11	Monthly ft3 usage	
Report savings to wastewater staff and others	Brad Davis	31-Oct-11	Monthly ft3 usage	

CLEARVILLE WASTEWATER TREATMENT PLAN

OBJECTIVES, TARGETS AND ACTION PLANS

Subject:	Energy Improvement Objective #2 Objective, Target and Action Plan	Document No:	EN-005.2
Approved By:	Jason Armstead	Date Issued:	11.30.2010

Energy Improvement Objective #2

Activity: RAS pumps – 8, 6 used at a time
Operation: Final clarification
Objective: Reduce energy usage in RAS pumps
Target: Reduce electricity use by 2% by December 31, 2011

Action Plan

Tasks	Responsible Party	Timeframe	Performance Measures	Comments
Develop baseline	Scott Adams	31-Dec-10	kWh	Collect information from VFDs
Research different operating scenarios	Jason Armstead	31-Dec-10	Report to wastewater operators	
Implement and monitor new operating scenarios	Maintenance Staff	31-Aug-11	kWh, process condition	
Implement final scenario	Maintenance Staff	30-Sep-11	kWh, process condition	
Conduct employee training	Elsie Kerns	31-Oct-11	Sign in sheet (training record)	
Track energy savings and process condition	Jason Armstead Chelsey Turner	30-Nov-11	kWh, process condition	Collect information from VFDs
Report savings to wastewater staff and others	Brad Davis	31-Dec-11	kWh, process condition	

CLEARVILLE WASTEWATER TREATMENT PLANT

BASIS FOR OBJECTIVE AND TARGET SELECTION

Subject:	**Basis for Objective and Target Selection**	**Document No:**	**EN-005.3**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**

Significant Activities	Operations	Legal / Other Requirements	Technological Opportunities	Financial / Operational Opportunities	Interested Parties	Selected Activities
Boilers – natural or digester gas (2)	Miscellaneous activities	1. Failure of boilers could lead to environmental compliance concerns - unable to run digesters 2. Safety / hazard concerns 3. Failure of boilers would cause digester gas to be released	1. Enhance gas conditioning 2. Tuning of heat loop	1. ~$400,000 - employee training, contracted installation, increased operational costs, reduce maintenance cost in digester, increase boiler life and efficiency 2. Low cost - potential for reprogramming	Wastewater staff Utility GM Utility Board	Goal #1
Air chiller unit	Miscellaneous activities	1. Failure could affect laboratory analysis	1. Efficiency of new unit versus current unit 2. Geothermal 3. Potential to use excess digester gas to run chiller	1. $100,000 - 10-15% efficiency improvement 2. ~$130,000 - less energy usage 3. Cost and operational challenges unknown	Wastewater staff Utility GM Utility Board	Current unit is still serviceable and cost of implementing is limiting

Significant Activities	Operations	Legal / Other Requirements	Technological Opportunities	Financial / Operational Opportunities	Interested Parties	Selected Activities
RAS pumps – 8, 6 used at a time	Final clarification	1. Improper control could cause effluent violations and could affect activated sludge process	1. Optimize process operation 2. Address leaves within system	1. Low cost - increase frequency of monitoring 2. Cost prohibitive	1. Wastewater staff	Goal #2
Refrigerator - 6	Miscellaneous activities	1. Failure could affect sample integrity	1. Replace with new equipment 2. Eliminate unnecessary refrigerators 3. Optimize temperature settings	1. ~$1,800 2. Disposal fee 3. Free - SOP	1. Wastewater staff	Insignificant energy usage
Potable hot water heater	Miscellaneous activities	None	1. Use heat loop instead of water heater 2. Install more efficient water heater 3. On demand water heaters	1. $25,000 - hire contractor 2. $4,000 - building constrictions 3. $4,000 - determine size needed for each location, may not have electricity at location	1. Wastewater staff	Current unit is still serviceable and cost of implementing is limiting
Reuse water system pumps – 5	Miscellaneous activities	None	1. Investigate pressure requirements	1. Low cost - monitoring of operations	1. Wastewater staff	Goal #3

CLEARVILLE WASTEWATER TREATMENT PLANT

AWARENESS AND COMPETENCY TRAINING PROCEDURE

Subject:	**Awareness and Competency Training**	**Document No:**	**EN-006**
Approved By:	**Jason Armstead**	**Date Issued:**	**2.03.11**

Purpose

This Procedure describes how Clearville Wastewater Treatment Plant provides awareness and competency training about energy efficiency in order that any person working for or on its behalf whose work could have a significant energy impact at the utility has appropriate education, training or experience.

Scope

This procedure applies to all persons who work for or on behalf of the CWWTP when engaged in utility work-related activities associated with the energy management system.

Definitions

Awareness Training: Training used to disseminate information that provides an individual with the basic/general knowledge/understanding of a your energy policy, programs, or systems
Competency Training: Training used to disseminate specific information on how to perform a specific task in a specific way in order to maintain control of your energy impacts.

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
	1. COMPETENCY TRAINING
The Energy Team	Annually or when there are any modifications to existing processes, review the list of Significant Energy Using Activities that affect the utility's use of energy (Document # En-003.2).
Maintenance Manager Chief Operators	Identify the name and position of employees and external stakeholders associated with these critical operations who need energy competency training.

ACCOUNTABILITY	RESPONSIBILITY
The Energy Team	Determine your training objectives. If needed, tweak current training materials to include up-to-date energy control issues.
Project Coordinator	Develop a training schedule and plan to deliver energy competency training to the employees and external stakeholders you have identified. (Note: The plan should describe the 5 W's - who, what, where, when, why - and also tell how)
Project Coordinator	Deliver the training and maintain training records.
Project Coordinator	Store competency training materials in Wastewater Division Manager's office.
The Energy Team	If change are made to any of the steps in operations, identify if any are energy critical and identify the employees and external stakeholders who may need updated energy competency training.
Project Coordinator	Update your current training materials to include these changes related to energy.
	At least annually monitor and verify that employees and external stakeholders are implementing operational controls and other directives as specified in the energy competency training and that they are aware of and understand the intent of the Energy Policy.
Project Coordinator	Report monitoring results and any suggested corrective actions to Wastewater Division Manager.
	2. AWARENESS TRAINING
Project Coordinator	Develop Energy awareness training to include: a. CWWTP Energy Policy b. The importance of energy conservation to the utility c. Employee and external stakeholder roles and responsibilities with respect to energy d. Significant energy using activities and operations -

ACCOUNTABILITY	RESPONSIBILITY
Project Coordinator	Develop a schedule and plan to deliver energy awareness training annually to all employees and appropriate external stakeholders. Wherever possible integrate the training with other training opportunities, e.g., shop-talks; safety meetings; computer; on-the-job, etc.)
Project Coordinator or Designee	Deliver energy awareness training and maintain training records.
Project Coordinator	Store awareness and competency training materials in Wastewater Division Manager's office.

References

Monitoring and Measurement System Procedure (Document # EN-010)
Corrective Action Procedure (Document # EN-011)
Training Plan and Schedule
Awareness Training Records
Competency Training Records
Awareness Training Materials
Competency Training Materials

CLEARVILLE WASTEWATER TREATMENT PLANT

INTERNAL AND EXTERNAL COMMUNICATION PROCEDURE

Subject:	**Internal and External Communication**	**Document No:**	**En-007**
Approved By:	**Jason Armstead**	**Date Issued:**	**2.03.11**

Purpose

This Procedure describes how Clearville Wastewater Treatment Plant communicates about its Energy Management System, including the energy policy, energy improvement goals, and energy saving progress with internal and external stakeholders.

Scope

This procedure applies to all employees and external stakeholders in CWWTP when engaged in utility work-related activities.

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
	1. INTERNAL COMMUNICATION
The Energy Team	Define the objective of this communication e.g., *I want to communicate information about our energy policy, energy targets, progress in achieving our targets, and the associated benefits the utility has achieved."*
The Energy Team	Identify the target audience, e.g., *all utility employees and those who work on behalf of the utility (e.g., contractors, suppliers).* Any language or cultural considerations to consider?
The Energy Team	Collect/update your data and information to represent the most current information.
Project Coordinator	Write the message content and identify the most appropriate form for the message.
Maintenance Manager Chief Operators	Identify when and where the message will be disseminated and who would be best to deliver the message.

ACCOUNTABILITY	RESPONSIBILITY
Maintenance Manager Chief Operators	Monitor the effectiveness of the communication.
Project Coordinator	Apply lessons learned and any needed corrective actions to your internal communication plan.
	2. EXTERNAL COMMUNICATION
Water Div. Manager Wastewater Div. Manager Electric Division Manager	Conduct an analysis of those key external stakeholders who have an interest in and the potential to impact your energy management goals.
The Energy Team	Define the objective of this communication e.g., *The purpose of this message is to communicate information about our energy policy, energy targets, progress in achieving our targets, and the associated benefits.*
The Energy Team	Identify the target audience for the current message and the key contact information.
Operations Manager Assistant Division Manager	Collect/update your data and information to represent the most current information.
Project Coordinator	Write the message content and identify the most appropriate form for the message.
Operations Manager Assistant Division Manager	Identify when and where the message will be disseminated.
Operations Manager Assistant Division Manager	Identify who would be best to deliver the message.
Operations Manager Assistant Division Manager	Monitor the effectiveness of the communication.
Project Coordinator	Apply lessons learned and any necessary corrective actions to your external communication plan.

References

Monitoring and Measurement System Procedure (Document # En-010)
Corrective Action Procedure (Document # En-011)
Training Plan and Schedule
Awareness Training Records
Competency Training Records
Awareness Training Materials
Competency Training Materials

CLEARVILLE WASTEWATER TREATMENT PLANT

DOCUMENT AND RECORD CONTROL PROCEDURE

Subject:	**Document and Record Control**	**Document No:**	**En-008**
Approved By:	**Jason Armstead**	**Date Issued:**	**3.18.11**

Purpose

This Procedure describes how CWWTP develops and implements a procedure for the approval, issue, maintenance, and control of all energy management system documentation and records.

Scope

This procedure applies to all employees and external stakeholders in the CWWTP fenceline when engaged in utility work-related activities associated with the energy management system.

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility will clearly define the documents and records they need to establish and maintain the energy management system. These documents and records will be labeled "CONTROLLED DOCUMENT" in the upper right hand corner of the document header.
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility will review the documents and records defined above to verify they are created, reviewed and authorized by appropriate personnel; distributed and easily available when and where needed; legible and readily identifiable; appropriate for user skill and language levels; the current version.
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility will verify that all controlled documents have a consistent document control header which includes: • The utility logo in the upper left hand corner • The words CONTROLLED DOCUMENT in the upper right hand corner • A document heading that includes: the name of the utility; the title of the document; a matrix telling the subject of the document, the document number, who approved the document, and the date it was originally approved.

ACCOUNTABILITY	RESPONSIBILITY
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility will verify that all controlled documents have a consistent document control footer which includes: • The name of the document • The page number • The document number • The revision date • A statement that says "Users of this document are responsible to ensure it is the most current version. Otherwise this document is invalid."
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility will verify that all controlled documents have a consistent document control format which includes: • Purpose • Scope • Definitions • Procedure/Plan • References
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility will verify that all controlled documents as appropriate provide information that tells • Who has responsibility • What needs to be done • When it needs to be done • Where it needs to be done • Where information about the task will be stored.
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility will verify that all controlled documents as appropriate provide information that lists any related documents, records or information sources which may be needed in order to carry out the tasks identified in this document.
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility fenceline will assure that documents and records verified above are appropriately distributed and available throughout the organization as needed.

ACCOUNTABILITY	RESPONSIBILITY
Water Manager Wastewater Manager Electric Manager (or designee)	Annually each department in the utility fenceline will remove or archive or destroy old or obsolete documents and records according to their record retention policy.

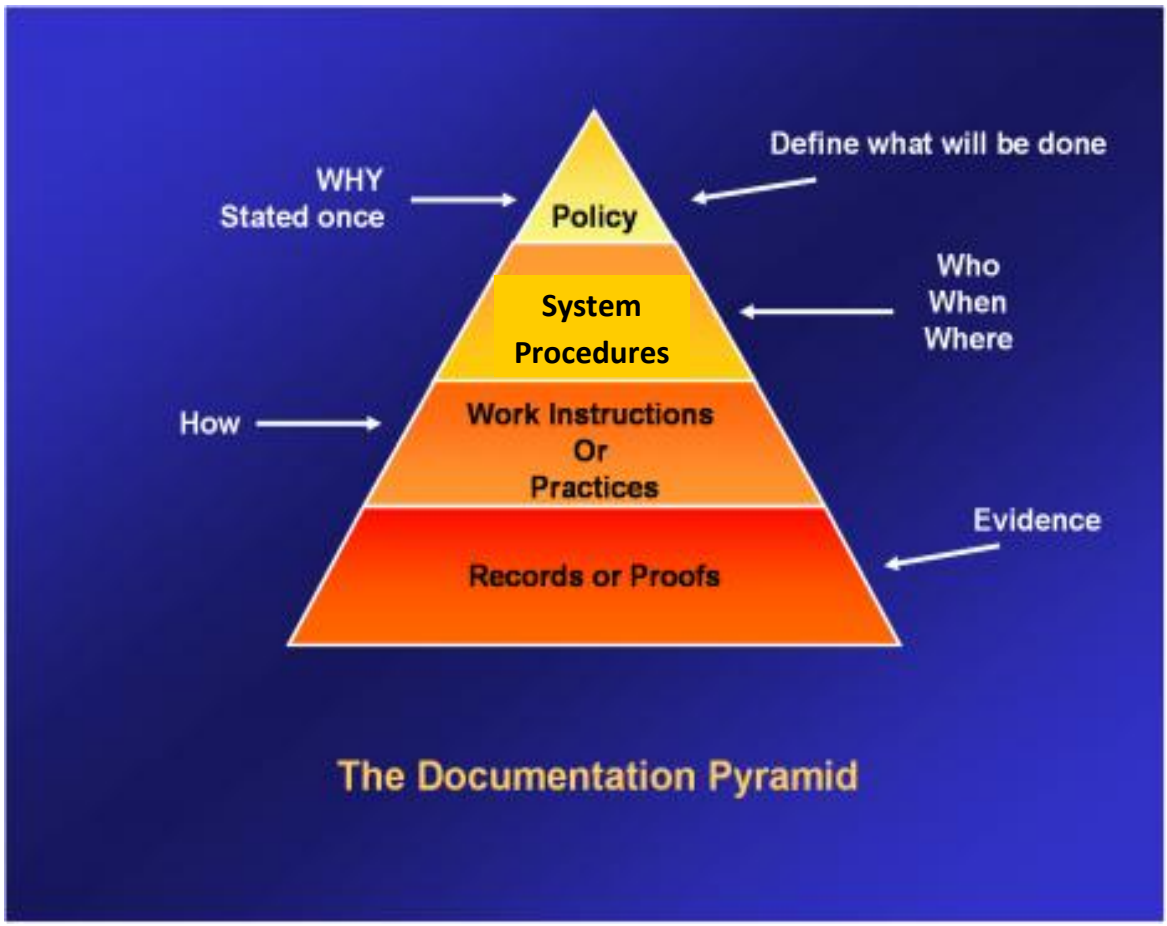
References

CLEARVILLE WASTEWATER TREATMENT PLAN

HIERARCHY OF DOCUMENTS

Subject:	**Hierarchy of Documents in the Energy Management System**	**Document No:**	**En-008.1**
Approved By:	**Jason Armstead**	**Date Issued:**	**4.03.2010**

An energy management system is an approach CWWTP uses to ensure that an energy efficiency program is part of the utility daily operations and ongoing strategic planning. The Energy Management System documentation is a hierarchy containing four tiers, as shown in the following illustration. All documentation moves from one level to the next in a descending order. If the system is properly structured, changes at one level will seldom affect the level above it, but may affect those below.



Tier 1: The first tier of documentation is the Energy Policy. This is the document that defines what will be done and why.

Tier 2: The second tier of documentation is Energy Management System Procedures. These procedures describe the methods that will be used to implement and perform the stated policies. The procedures define who should perform the specific tasks, when the task should be done, and where the documentation will be made showing that task was performed.

Tier 3: Work instructions are usually department, machine, or task oriented and spell how a job will be done. The instructions are the most detailed of the documentation hierarchy. A work instruction may be in the form of a detailed drawing, routing sheet, maintenance schedule, specific job function (for example, turn nut four turns clockwise), photograph, video, or simply a sample for comparison or conformity.

Tier 4: Records are a way of documenting that the policies, procedures, and work instructions have been followed. Records may be forms that are filled out, a stamp of approval on a product, or a signature and date on some type of document, such as routing sheet. Records are used to provide traceability of actions taken on a specific product or batch of products. They provide data for corrective actions and a way of recalling products, if necessary.

CWWTP
Clearville Wastewater

CONTROLLED DOCUMENT

CLEARVILLE WASTEWATER TREATMENT PLANT

LEGAL AND OTHER REQUIREMENTS AND COMPLIANCE STATUS PROCEDURE

Subject:	**Legal and Other Requirements and Compliance Status**	**Document No:**	**En-009**
Approved By:	**Jason Armstead**	**Date Issued:**	**6.15.11**

Purpose

This Procedure describes how CWWTP identifies the environmental laws and regulations applicable to its operations and activities, and how this information is kept up to date. With respect to its compliance status, the procedure describes how CWWTP periodically evaluates its compliance with legal and other requirements, addresses instances of noncompliance, and ensures that proper procedures are in place to identify, manage, and prevent problems from reoccurring.

Scope

This procedure applies to all employees and external stakeholders in CWWTP's fenceline when engaged in utility work-related activities.

Definitions

As you feel necessary, list the abbreviations or potentially confusing terminology used in this document. E.g., defining what you mean by "other requirements" might be useful here.

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
	3. IDENTIFYING LEGAL AND OTHER REQUIREMENTS
Wastewater Division Manager	Annually, identify and maintain information about the legal and other requirements that apply to our operations and activities.
Wastewater Division Manager	Evaluate if working toward our energy improvement targets has involved equipment or operational changes that could affect our compliance.
Wastewater Division Manager	If yes, evaluate if there is any need to change operational controls, SOPs, maintenance schedule, documentation, provide training, increase monitoring and measuring, etc.
Wastewater Division Manager	Use our Corrective Action Procedure to implement, track, and maintain appropriate changes.

ACCOUNTABILITY	RESPONSIBILITY
Assistant Division Manager	Use our Communication Procedure to disseminate information about legal and other requirements and any associated changes so that appropriate stakeholders and personnel whose work is affected by the changes understand what this mean to how they do their jobs every day.
	4. COMPLIANCE STATUS
Wastewater Division Manager	Annually, verify our Compliance Status, prepare a report of the assessment and deliver the report to define appropriate recipient.
Wastewater Division Manager	Verify that previous instances of noncompliance have been corrected and prevented from reoccurring.
Assistant Division Manager	Communicate information about our compliance status to appropriate Staff and key stakeholders
Wastewater Division Manager	Using our Corrective Action Procedure, identify any needed corrective actions, track them to closure, and report the effectiveness to the Utility General Manager.

References

Awareness and Competency Training Procedure (Document No. EN-006)
Corrective Action (Document No. EN-011)
CAR (Document No. EN-011.1)
Controlling Documents and Records (Document No. EN -008)
Monitoring and Measurement (Document No. EN -010)

CLEARVILLE WASTEWATER TREATMENT PLANT

MONITORING AND MEASUREMENT SYSTEM PROCEDURE

Subject:	**Monitoring and Measurement System Procedure**	**Document No:**	**En-010**
Approved By:	**Jason Armstead**	**Date Issued:**	**4.19.2011**

Purpose:
This Procedure describes how Clearville Wastewater Treatment Plant monitors and measures the key characteristics of its energy management system.

Scope:
This procedure applies to all employees and external stakeholders in the Clearville Wastewater Treatment Plant when engaged in utility work-related activities associated with the energy management system.

Definitions:
Key characteristics include:

- Measuring energy consumption and performance, especially as it relates to significant energy using activities;
- Maintaining the efficiency of energy using equipment;
- Regularly reviewing your progress in achieving energy improvement goals;
- Verifying conformance with operational controls (Work Instructions);
- Evaluating regulatory compliance

Procedure/Plan:

ACCOUNTABILITY	RESPONSIBILITY
The Energy Team	Annually, clearly define what each department in the utility will monitor and measure regarding their energy consumption and performance, when it wants the information reported, and to whom.
Maintenance Manager Chief Operators	Annually each department in the utility will identify the energy using equipment that is most significant in their energy management system, and develop and implement an appropriate maintenance schedule for this equipment.

ACCOUNTABILITY	RESPONSIBILITY
Operations Manager Assistant Div. Manager Project Coordinator	Semi-annually each department in the utility whose work is associated with energy improvement goals will monitor its progress in completing the tasks in their action plans and achieving the energy targets. Each department will report results to the Energy Team.
Operations Manager Assistant Div. Manager Project Coordinator	Semi-annually each department in the utility whose work is associated with the energy management system will verify that employees are performing tasks as suggested in operational control (work instructions, SOPs, etc.)
Operations Manager Assistant Div. Manager	Annually the utility will identify if they are current with any new legal or other requirements.
Wastewater Div Manager	Annually the utility will check their compliance with legal and other requirements.

References:

- Legal and Other Requirements and Compliance Status (Document # En-009)
- Objectives, Targets and Action Plans (Document # En-005)
- Operational Controls (Document # En-004)

CLEARVILLE WASTEWATER TREATMENT PLANT

CORRECTIVE ACTION

Subject:	Corrective Action	Document No:	EN-011
Approved By:	Jason Armstead	Date Issued:	5.24.2011

Purpose

This Procedure describes how Clearville Wastewater Treatment Plant implements and maintains a system to identify nonconformances and problems and to correct these and track them to closure.

Scope

This procedure applies to all employees and external stakeholders in CWWTP when engaged in utility work-related activities associated with the energy management system. This procedure applies to all nonconformances requiring corrective action by staff. These will typically be identified by the following methods: Monitoring and measurement, Compliance Audits, Safety Audits, Inspections, Incident Reports, Complaints, Compliance Inspections, Permit Inspections, Employee suggestions.

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
All employees and key stakeholders	Identify potential problem or nonconformance and notify your immediate supervisor or Energy Team member by e-mail.
Maintenance Manager and Chief Operators	Determine whether the potential nonconformance needs a documented corrective action request (CAR). If yes, complete a CAR. If no, discuss rationale with staff reporting potential nonconformance. (Note: the severity of the nonconformance will determine the action.)
Operations Manager, Assistant Division Manager, Electric Division Manager	Review corrective action request information and inform Operations Manager, Assistant Division Manager and Electric Division Manager of any identified nonconformance that involves a potential regulatory or legal noncompliance. Determine appropriate staff to take corrective action, set schedule and responsibilities.
Operations Manager, Assistant Division Manager, Electric Division Manager	Notify appropriate staff and request immediate corrective action if containment of some type is needed or if this is a regulatory noncompliance.
Maintenance Manager Chief Operators	Identify the root cause of the nonconformance.

ACCOUNTABILITY	RESPONSIBILITY
Maintenance Manager Chief Operators	Identify appropriate corrective actions, schedule and responsibilities and forward electronically to the Energy Team, with a copy to work section.
Maintenance Manager Chief Operators	Determine the corrective action that will be used in this case.
All Staff and Key Stakeholders	Implement the necessary corrective action.
Maintenance Manager Chief Operators	Track the corrective action to closure.
Maintenance Manager Chief Operators	Verify Effectiveness.
Project Coordinator	Change SOPs or Training materials if required
Project Coordinator	Adjust Documents using document control processes

References

Corrective Action Request (CAR) Form (Document No. EN-011.1)
Competency and Awareness Training (Document No. EN-006)
Controlling Documents and Records (Document No. EN-008)
Internal and External Communication (Document No. EN-007)

CLEARVILLE WASTEWATER TREATMENT PLANT

CORRECTIVE/PREVENTIVE ACTION REQUEST (CAR)

Subject:	**Corrective Action Form**	**Document No:**	**En-011.1**
Approved By:	**Jason Armstead**	**Date Issued:**	**10.03.2010**

CAR #: **ISSUE DATE:** **COMPLETION DATE:**

	Name	Department	Phone/Email
Requested By:			
Issued To:			

Problem Statement:

Most Likely or Root Cause(s):

Implemented Solutions:
Completed by recipient, including dates

Results:
Confirming effectiveness

Closed By: **Closing Date:**

CLEARVILLE WASTEWATER TREATMENT PLANT

MANAGEMENT REVIEW PROCEDURE

Subject:	**Management Review**	**Document No:**	**En-011**
Approved By:	**Jason Armstead**	**Date Issued:**	**8.27.11**

Purpose

This procedure describes the process and primary agenda of issues to be included in the Clearville Wastewater Treatment Plant's Management Review meetings for evaluating the organization's Energy Management System. The review is intended to provide a forum for discussion and improvement of the Energy Management System and to provide management with a vehicle for making any changes to the system necessary to achieve the organization's goals.

Scope

This procedure applies to selected employees and external stakeholders identified by CWWTP's Energy Team who will participate in the Management Review meeting and who will be involved in communicating information about the Energy Management System.

Definitions

Senior Management: Utility Manager, Water Div. Manager, Wastewater Div. Manager, Electric Div. Manager

Procedure/Plan

ACCOUNTABILITY	RESPONSIBILITY
Energy Team	Annually confirm the date and time for the Management Review Meeting and identify who you would like to attend. Ascertain if you can piggyback this meeting on to existing management meetings already on the calendar.
Energy Team	Determine the topics you will include in the Management Review. At a minimum the Management Review meeting will consider the following topics: progress in achieving objectives and targets; quantitative and qualitative energy benefits; suitability and effectiveness of the Energy Management System; continued appropriateness of the Energy Policy; focus areas for the next round of energy objectives and targets; lessons learned in developing and implementing the energy management system.
Energy Team	Develop an agenda for the Management Review meeting and distribute it as appropriate.

ACCOUNTABILITY	RESPONSIBILITY
Wastewater Assistance Division Manager	Lead the Management Review meeting.
Project Coordinator	Document and record the issues discussed, what decisions were reached, and any follow up action items and responsibilities The meeting minutes will include, at a minimum, a list of attendees, a summary of key issues discussed, and any action items arising from the meeting. Any action items will be tracked to closure using the Monitoring and Measurement System Procedure. A copy of the meeting minutes will be distributed to attendees and any individuals assigned action items. A copy of the meeting minutes will be retained on file.
Energy Team	Develop plans to communicate the results of the Management Review meeting and the quantitative and qualitative benefits the Energy Management System has achieved.

References:

Document Control (Document # En-008)
Energy Policy (Document # En-002)
Communication (Document # En-007)
Monitoring and Measurement (Document # En-010)
List of Significant Energy Using Activities (Document # En-003.3)
Objectives and Targets and Action Plans (Document # En-005)