



National Biosolids Partnership

BMP Audit Report

City of Chattanooga Moccasin Bend Wastewater Treatment Plant

Chattanooga, TN

2016 Internal Audit

Audit Dates:	January 25-29, 2016
Audit Conducted by:	City of Chattanooga ISS BMS Internal Audit Team
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Report Date:	February 09, 2016
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EXECUTIVE SUMMARY

The City of Chattanooga Interceptor Sewer System BMS Internal Auditor conducted an internal audit of its Biosolids Management System in late January of 2016. The purposes of the audit were:

- To determine if the Chattanooga ISS is complying with its Biosolids Management Policy, the NBP Code of Good Practice, and program requirements as found in the Chattanooga BMS Manual;
- To determine if the Chattanooga ISS is making satisfactory progress toward its BMS Goals and Objectives; and
- To evaluate the effectiveness of the City of Chattanooga's Biosolids Management System by reviewing selected processes from within the Biosolids Value Chain.

Audits were conducted for all processes and associated elements in the biosolids value chain:

Pretreatment & Collection;

Wastewater Treatment & Solids Generation;

Biosolids Preparation (incl. stabilization, conditioning, & handling);

Solids Storage & Transportation; Biosolids Use-Land Application-Tennessee and Alabama;

Communication (internal & external); Competency, Awareness, & Training;

Compliance (with legal & other requirements); Contractor Control;

Corrective and Preventive Action; Critical Control Points & Operational Controls (identification); Document Control & Recordkeeping; Emergency Preparedness;

BMS Documentation; BMS Planning; Engineering (incl. process design);

Goals & Objectives; Internal BMS Audits; Laboratory;

Maintenance; and Management Involvement (incl. Policy, Mgmt. Review);

Maintenance Safety

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Subject / Process	Key BMS Elements *	Internal Audit 2015	Internal Audit 2016	Internal Audit 2017	Internal Audit 2018
			Interim		Interim
Management System Dynamics					
Review of Significant Changes			✓		✓
Examination of Outcomes	-		✓		✓
Effectiveness Reviews: Corrective & Preventive Action Status Goals & Objectives Status Management Review			✓		✓
Policy commitments			✓		✓
Communication Program (incl public participation)			✓		✓
Review of Internal Audits (& related corrective action)			✓		✓
Verification of corrective action for open Third Party Audit nonconformances			✓		✓
Process Audits					
Pretreatment	3,7,10,13	✓			
Collection System	3,7,10,13			✓	
Wastewater Treatment & Solids Generation	3,7,10,13			✓	
Biosolids Preparation (incl stabilization, conditioning & handling)	3,7,10,13		✓		
Solids Storage & Transportation	3,7,10,13		✓		
Biosolids Use – Land Application - Tennessee	3,7,10,13	✓			
Communication (internal + external)	6,9,15		✓		
Competency, Awareness & Training	7,8			✓	
Compliance (with legal & other requirements)	4,13,14		✓		
Control of Contractors & Suppliers	various	✓			
Corrective and Preventive Action	14	✓		✓	
Critical Control Points & Operational Controls	3		✓		

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Subject / Process	Key BMS Elements *	Internal Audit 2015	Internal Audit 2016	Internal Audit 2017	Internal Audit 2018
			Interim		Interim
Document Control & Recordkeeping	12				✓
Emergency Preparedness	11			✓	
BMS Documentation	1				✓
Engineering / Process Design (incl mgmt of change)	3,4,10	✓			
Goals, Objectives & Action Plans (setting)	5,13	✓		✓	
Internal Audits	16	✓			
Laboratory	13	✓			
Maintenance	10	✓			
Management Involvement (incl Roles & Responsibilities, Mgmt Review)	2,5,7,17			✓	✓

* - applicable requirements of all BMS Elements will be audited for each process. "Key elements" are shown for reference to demonstrate that all 17 NBP Elements are covered during the interim audits cycle, as required.

The audits consisted of interviews with City of Chattanooga ISS staff members with responsibility in the processes/elements covered by the audit, a review of applicable records, and, where required, direct observation of operations.

The BMS internal audit identified a number of strengths in the City of Chattanooga's program, three minor nonconformances for which corrective action is required, and eight opportunities for improvement, which are summarized below. Corrective and preventive action plans addressing findings from the previous internal/interim audits were also reviewed and all were found to be adequate.

Based on the results of the internal audit, the City of Chattanooga ISS is complying with its Biosolids Management Policy and the National Biosolids Partnership Code of Good Practice, is making satisfactory progress toward achieving its biosolids program goals and objectives, and its Biosolids Management System is working effectively.

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SUMMARY OF AUDIT FINDINGS

Minor Nonconformances

- **Minor Nonconformance IAT/16-01** BMS Manual Section 5.3 CONTROL OF CONTRACTORS AND SUPPLIERS purpose states that the BMT will ensure that the services provided by contractors and suppliers result in positive outcomes. Denali Water Solutions, holder of a thirty six month blanket contract for Land Application and Beneficial Use of Class B Biosolids for the WRD, has failed to meet the following contractual obligations, which may affect outcomes:
 - (Paragraph 5.1.l) Contractor shall develop for the CITY's approval a contingency plan within thirty (30) days of the signing of this Agreement, that addresses, at a minimum, the following (Elements 11, 12):
 - Abnormal weather conditions that could interrupt biosolids disposal operations
 - Malfunction of equipment critical to the biosolids disposal operation
 - Loss of use or access to land application site(s)
 - (Paragraph 1.9) Storage shall not exceed 45 days at land application sites
 - (Paragraph 5.4.u) Contractor shall maintain the biosolids staging and/or storage areas at each application site in a clean condition . . .
 - (Paragraph 5.4.aa) Contractor shall be responsible for the prompt clean up and repair of any damages to any farms or tracts caused by the land application process. This includes staging areas, as well as farm and field roads.
 - (Paragraph 5.5.e) Contractor shall develop and provide CITY with standard operating procedures related to biosolids land application and/or beneficial use and any updates that may be required during the contract period. (Element 10, 12)

Correction/Corrective Action: Issued to BMT (which includes the Land Application Contractor)

5.3 CONTROL OF CONTRACTORS AND SUPPLIERS

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Purpose

To ensure that the services provided by contractors and suppliers result in positive outcomes.

Responsibilities

Director-Waste Resources Division – reviews, approves, and communicates to Public Works management and City Council necessary contractor and supplier services.

BMS Management Team – oversee contractors and suppliers in their respective areas and evaluate performance.

BMS Coordinator – oversees and evaluates contractor activities as authorized and directed by the Director of Waste Resources and Plant Manager.

Procedure

Use the City of Chattanooga's procedures for identifying, selecting, approving, and awarding of contracts to contractors and suppliers.

Ensure that contractors and/or suppliers are informed of their responsibilities in providing their services, especially as it relates to the Biosolids Management Program. Inform through their contracts, service agreements, letters, and memos of understanding, memorandums, or other means of communication.

- Ensure that contractors' required responsibilities include, but are not limited to, the following:
 - Comply with all applicable legal and other requirements
 - Establish and maintain operational controls
 - Establish and maintain regular monitoring and measurement procedures and practices
 - Prepare and maintain an emergency preparedness and response plan
 - Properly train all personnel and/or subcontractor personnel
 - Communicate with interested parties in accordance with City policies
 - Maintain control of applicable documents and records
 - Maintain and provide to City all applicable data and performance measures
 - Participate in corrective and preventive action plans

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Evaluate the contractor or supplier's performance against established requirements as directed by the Director-Waste Resources Division. Communicate the result of the evaluation to the contractor or supplier. For inadequate performance, require contractor or supplier to submit corrective and preventive action plans for review and approval.

The Director-Waste Resources Division takes action to ensure that continuing inadequate performance by contractors or suppliers is addressed.

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- **Minor Nonconformance IAT/16-02** BMS Manual Section 4.3 DOCUMENT CONTROL AND RECORDKEEPING procedure, section A, states that the BMT will identify documents used for managing biosolids activities that require control and individuals for controlling these documents. The person responsible for controlling each document takes steps to (Elements 10, 12):
 - Ensure each document is approved for adequacy, identified, dated, readily available, and reviewed as necessary to ensure it is correct, complete, and current.
 - Communicate approved changes to persons affected by the change.
 - Ensures the correct versions of documents are in use.
 - Removes obsolete versions of controlled documents from unintended use.
 - Ensures that the most current version of each controlled document and the Document Control and Revision Log are properly updated as necessary and stored on the BMS Server, as applicable.

The following documents did not meet all of the above criteria (responsible party as identified in Appendix F of the City of Chattanooga BMS Manual):

- No SOP for setpoints of liquids, thickening, etc (Plant Operations Supervisor – Liquids)
- SOPs for Citico PS and CSO not onsite (Operations Supervisor Pump Stations/CSO)
- SOPs for Primaries kept in O&C, not readily available (Plant Operations Supervisor – Liquids)
- No SOP for Hazardous Waste Disposal or Storage of Hazardous Waste (Occupational Safety Specialist)
- SOPs out of date for Insects, Lock-out/Tag-out, Safety and Security, and Plant Tours (Occupational Safety Specialist)
- SOPs out of date for Pretreatment (Pretreatment Supervisor)

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- More SOPs needed for Scalehouse, including handling trucks that are out of compliance, random sampling of septic haulers, and emergency evacuation procedure (Plant Operations Supervisor – Solids)
- SOPs for Lab out of date (Manager Laboratory Services)
- SOPs for Contractor Services (Applicable Contractor)

Correction/Corrective Action:

4.3 DOCUMENT CONTROL AND RECORDKEEPING

Purpose To identify and control important documents used for managing Waste Resources Division activities and records required to demonstrate Waste Resources Division performance.

Responsibilities

Responsible Person – ensures effective control of their designated document(s) and record(s).

Procedure

A. Control of Documents

Identify documents used for managing biosolids activities that require control and individuals responsible for controlling these documents (Appendix F).

- The person responsible for controlling each document takes steps to:
 - Ensure each document is approved for adequacy, identified, dated, readily available, and reviewed as necessary to ensure it is correct, complete, and current.
 - Communicate approved changes to persons affected by the change.
 - Ensures the correct versions of documents are in use.
 - Removes obsolete versions of controlled documents from unintended use.
 - Ensures that the most current version of each controlled document and the Document Control and Revision Log are properly updated as necessary and stored on the BMS Server, as applicable.

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B. Control of Records

Identify records used for managing biosolids activities that require control and individuals responsible for controlling these records. The person responsible for controlling each record takes steps to: – Ensure records are identifiable, legible, secure, readily accessible, and changed only under the authority of the responsible person. – Ensure records are retained and disposed of consistent with City of Chattanooga records retention requirements.

C. Documents and Records of External Origin

Regulations, job descriptions, material safety data sheets, O&M information for manufacturers are considered to be documents of external origin. The responsible person ensures these documents are readily accessible where needed. Records retained by contractors are considered to be records of external origin. Such records are controlled as deemed appropriate by the BMS Coordinator so that they are readily accessible and maintained securely.

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- **Minor Nonconformance IAT/16-03:** BMS Manual Section 4.4 COMPETENCY, AWARENESS, AND TRAINING procedure states that the BMT will identify competency requirements for each job and communicate to staff.
 - Identify training needs for each job necessary to maintain an acceptable level of staff competency including skills, education, experience and other qualifications. Competency requirements for each specific job are determined by the supervisor of the appropriate area of operation. Required training for Waste Resources Division employees is as follows:
 - Job responsibilities
 - Biosolids Management System awareness training
 - Occupational Health and Safety Training
 - Emergency Preparedness Training (Element 8)
 - Other training required by legal and other requirements

There has been no staff Emergency Preparedness Training documented. In addition, MBWWTP has not conducted an Emergency Preparedness Drill in over three years. The effectiveness of the current plan is uncertain (Element 11).

Correction/Corrective Action:

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4.4 COMPETENCY, AWARENESS AND TRAINING

Purpose

To ensure that personnel who perform biosolids activities on behalf of the City of Chattanooga are aware of their responsibilities within the Biosolids Management System and are capable of performing assigned responsibilities safely and effectively.

Responsibilities

BMS Management Team – evaluate competency and awareness of staff within respective areas of responsibility and assign appropriate training.

Contractors – ensure competency and awareness of personnel in respective areas of service and ensure appropriate training is provided.

Opportunities for Improvement

- Internal communication could be improved. Many of the staff interviewed stated that they were unaware of the change from Chlorine to Sodium Hypochlorite, for example.
- SOPs could be made more readily available for operators by keeping multiple copies, both in a central location, and near to the equipment referenced.
- City of Chattanooga Individual Truck Discharge Operation Permit Application should be updated, and septage haulers should be notified of the new random sampling provision.
- Corrective maintenance should be performed on the cameras in CB2. In addition, the main power switch for CB2 is exposed and could be a safety concern. Further, solids operators should have a more secure way of delivering their samples to the lab, as they currently walk the samples over, no matter the weather conditions.
- Additional First Aid stations would be useful. There are currently only two in the plant and none at any PS or CSO.
- Utilize outreach education in order to improve public perception.
- Sewer maintenance SOPs are not currently listed as controlled documents in Appendix F of the BMS manual. Adding these would ensure accountability.
- Contracted cleaning crew should wear PPE into buildings, as necessary.

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BMP Strengths

- A study was completed by consulting engineers for a Green Infrastructure Program Plan which includes controls for the combined sewer system sub-basins which will reduce I&I flows to the wastewater treatment facility. The plan was approved by the EPA and will be implemented 2016-2018.

file://mbfileserv1/bmp/Biosolids%20Management%20Team/Matthew%20Snyder%20-%20Sewer%20Project%20Coordinator/Projects/Collection%20System/Consent%20Decree%20Documentation/GI%20Master%20Plan_3_18_15_Public%20Review%20Submittal.pdf

- Fats, Oils, and Grease (“FOG”) Management CMOM Program to establish methods to identify persistent sources of FOG causing problems in the WCTS and the best method or mechanism for addressing those sources; Established a Performance Measure to Maintain 100% trained staff to monitor the number of Pretreatment Program employees trained on FOG Management Program. The plan was approved by the EPA and is ongoing. In addition to this plan, Matthew Snyder has been mailing out flyers to educate the public on FOG, and conducting outreach programs in local schools.
- Evaluate the effectiveness of the FOG Program and identify new goals and Key Performance Indicators (KPIs); Monitor cost of regulatory fines for SSOs due to FOG, and Established Performance Measure to < 15% ratio of noncompliance/inspections to measure the number of annual Noncompliance Notifications versus the total FSE inspections.
<file://mbfileserv1/bmp/Biosolids%20Management%20Team/Matthew%20Snyder%20-%20Sewer%20Project%20Coordinator/Projects/Collection%20System/Consent%20Decree%20Documentation/Annual Report No 2 - 2014.pdf>
- MBWWTP Process Controls Program: The MBWWTP Process Controls Program is being developed pursuant to Paragraph 25 of the CD. The purpose of this project is to minimize the frequency, duration, and volume of any bypass and violation of an effluent limit at the MBWWTP through proper management, operation and maintenance controls. This program was submitted to the PDR for public review and comment on October 13, 2014, followed by submittal to the EPA and TDEC on November 18, 2014. EPA approval granted in March 2015.
- The MBWWTP Bar and Fine Screen Replacements project was performed in late 2015 and early 2016. Existing screening facilities at the MBWWTP influent pump station are inefficient and at the end of their useful service life. In

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addition to their age, the fine screens blind often due to rags in the influent. The purpose of this project is to design and construct a solution which will correct the screening issues at the plant.

- The MBWWTP Effluent Disinfection System Upgrade project was performed in January of 2016. This project involved the design and construction of a new bulk sodium hypochlorite system to replace the chlorine gas system at the MBWWTP and drastically increases safety to the operators and public by eliminating the need for Chlorine Gas.
- The MBWWTP Pump Station Operations Program is ongoing. The project is meant to reduce Sanitary Sewer Overflows and make sure that all appropriate staff are aware of the proper operating conditions necessary at each Pump Station and Combined Sewer Overflow Treatment Facility, while providing guidance to staff to make operational adjustments, as necessary, to maintain operations.
- 74,483 wet tons of biosolids were utilized for land application, with zero taken to landfills.
- There have been no NOVs since the BMP began at MBWWTP.
- A new training program has begun, wherein a retired operator was brought back as a contractor in order to train, cross-train, and mentor newer liquids operators.

AUDIT SCOPE AND METHODOLOGY

The City of Chattanooga Interceptor Sewer System BMS Internal Auditor conducted an internal audit of the City's Biosolids Management System in late January of 2016. The purposes of the internal audit were to determine if the Chattanooga ISS was complying with its Biosolids Management Policy, the NBP Code of Good Practice, and program requirements as found in the Chattanooga BMS Manual, making progress toward its BMS Goals and Objectives, and to evaluate the effectiveness of the City of Chattanooga's Biosolids Management System by reviewing Management System Dynamics including Examination of Outcomes by reviewing all processes and associated elements in the Biosolids Value Chain.

A new internal audit team was created, utilizing eight City of Chattanooga ISS staff members selected by the Director-Waste Resources and the staff members' respective supervisors. Those individuals were chosen based on their knowledge of the organization's operations and their ability to gather evidence objectively. The

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new audit team received BMS audit direction from Ms. Trudy Johnston of Material Matters during this 2016 audit.

The scope of the audit covered the following processes and associated elements of the Chattanooga biosolids value chain. Audits were conducted for the following management system dynamics and processes: Review of Significant Changes, Examination of Outcomes, Effectiveness Reviews, Policy Commitments, Communication Program, Review of Internal Audits, Verification of corrective action for open audit nonconformances, Biosolids Preparation, Solids Storage and Transportation, Land Application in Tennessee and Alabama, Communication (internal and external), Compliance, and Critical Control Points and Operational Controls; Progress toward resolving previous findings from the most recent internal audits was also evaluated in this year's internal audit.

The process audits consisted of interviews with City of Chattanooga ISS staff members with responsibility in the processes covered by the audit, a review of applicable records, and, where required, direct observation of operations. Staff members interviewed were identified by the internal audit team, and along with documents reviewed are listed in the Appendix.

Conformance with City of Chattanooga's Biosolids Management Policy

1. Managing biosolids in an environmentally sound, sustainable, socially acceptable, cost-effective, and safe manner, in accordance with the ten principles of the NBP Code of Good Practice—In 2015, Chattanooga once again beneficially reused virtually all of the biosolids generated, which were land applied in Tennessee and Alabama, thus saving landfill space and costs of approximately **\$2.8 million per year and reducing the City's carbon footprint**. No lost time accidents related to biosolids were incurred in 2015. **Biosolids again met the EPA's criteria for Class B material. There continues to be a very high level of satisfaction with Chattanooga's product among end users, attributable to the quality of the product and the fertilizer cost savings realized by the farmers in the program.**
2. Complying with all applicable federal, state, and local laws and regulations pertaining to biosolids including management, transportation, storage, and beneficial use and disposal of biosolids—The City of Chattanooga and their contractors were not cited for any 503 violations (air, metals, TDOT, etc.) and did not receive any NOVs in 2015. Procedures were established in 2014 to evaluate trends in lab analysis results, with specific emphasis on metals and vector attraction reduction, to ensure product quality prior to field distribution. These procedures were followed effectively in 2015.

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3. Requiring land appliers of biosolids to comply with the provisions of the NBP Manual of Good Practice as well as local, state, and federal laws, rules, regulations, and guidelines governing land application practices—**The City's** agreement with Denali spells out the required conduct of the land application contractor. Denali has collaborated as partners with the City in most aspects of the program improvements undertaken during the year, such as production of Class B product, vector attraction reduction improvements, and research toward the new TDEC permitting requirements for 2015. Application rates are derived with a long term view that allows for multiple applications over a period of several years. Safety factors are incorporated so that biosolids are applied on permitted land application sites at lower rates than the specific agronomic loading rates prescribed by the University of Tennessee Agricultural Extension office for the specific crop being planted. There were no NOVs or violations of the federal 503 regulations in 2015.
4. Implementing a Biosolids Environmental Management System that conforms to the NBP BMS Program—**Chattanooga's Biosolids Management Team** continue effectively to implement the quality management philosophy and commitment to continual improvement. Also, the introduction of the new state permitting requirement amplifies the benefits of being an NBP certified organization, where permits for each individual application location are no longer required, but are covered by the general permit.

Conformance with the NBP Code of Good Practice

1. Compliance: To commit to compliance with all applicable federal, state, and local requirements regarding production at the wastewater treatment facility, and management, transportation, storage, and use or disposal of biosolids away from the facility—**This commitment is contained in Chattanooga's Biosolids Management Policy.** Chattanooga has suffered no violations of the federal 503 code and received no NOVs in 2015.
2. Product: To provide biosolids that meet the applicable standards for their intended use or disposal—**The City of Chattanooga's biosolids product is well established as meeting Class B requirements for land application.**
3. Environmental Management System: To develop an environmental management system for biosolids that includes a method of independent third-party verification to ensure effective ongoing biosolids operations—Chattanooga has elected to remain in the NBP program and continue the certification process. The latest (year 5) reverification preparation/internal audit was completed in January 2014. All findings needing correction were **addressed through Chattanooga's Corrective and Preventive Action**

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procedure. The interim/internal audit verified that Chattanooga's biosolids program met the expectations and requirements of the NBP, however, Chattanooga chose to change the designation of the BMS at Gold level. The five year third party reverification audit took place sometime in the first quarter of 2015.

4. Quality Monitoring: To enhance the monitoring of biosolids production and management practices—The City of Chattanooga continues to conduct analytical laboratory tests beyond requirements to ensure product quality. A program of trend analysis was implemented in the last year with specific emphasis on metals content and vector attraction reduction. The City conducts biweekly inspections of application sites to ensure quality land application, and random inspections of land application contractor and subcontractor vehicles.
5. Quality Practices: To require good housekeeping practices for biosolids production, processing, transport, and storage, and during final use or disposal operations—Chattanooga has implemented new handling procedures for first-in first-out land application and for cold weather filter cake handling to minimize water vapor generation upon release of the cake from the filters. Procedures remain in place to keep the biosolids staging area clean and free of debris.
6. Contingency and Emergency Response Plans: To develop response plans for unanticipated events such as inclement weather, spills, and equipment malfunctions—Chattanooga's **BMS Emergency Preparedness and Response Plan**, with emergency contact information in case of chemical release, fire, severe weather, or other unplanned event, was last updated effective January 8, 2015. **Denali personnel have been trained in the city's BMS EP&RP; they also have their own spill response plan.**
7. Sustainable Management Practices and Operations: To enhance the environment by committing to sustainable, environmentally acceptable biosolids management practices and operations through an environmental management system—**This commitment is contained in Chattanooga's Biosolids Management Policy.** Since mid-2005, virtually all biosolids generated at the MBWWTP were beneficially reused by land applying at agricultural farmland and special locations such as Hiwassee Wildlife Refuge, Williams Island, and Prentice Cooper State Forest, thus saving landfill space and costs of approximately \$2.8 million per year, and reducing the City's carbon footprint.

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8. Preventive Maintenance: To prepare and implement a plan for preventive maintenance for equipment used to manage biosolids and wastewater solids— Chattanooga completed implementation of the Maintenance and Reliability program, and as a follow up to that program, Chattanooga is providing training for mechanics and electricians through Chattanooga State Community College in preventive and lean maintenance practices. Plant assets used for biosolids processing and treatment are **managed through Chattanooga's Computerized Maintenance Management System (CMMS), Cityworks**, which has been modified to improve the work order system. A significantly bolstered staff is working hard to improve workflows, planning, and organization of preventive and corrective maintenance efforts.
9. Continual Improvement: To seek continual improvement in all aspects of biosolids management—Chattanooga is more effectively using the CAPA process by implementing problem-solving committees to address operational issues. Going forward in 2016, the drive for continual improvement will focus on cost effectiveness of the processes involved in the biosolids value chain, primarily energy efficiency, potential revenue or cost offset, and reduction of offsite management costs.
10. Communication: To provide methods of effective communication with gatekeepers, stakeholders, and interested citizens regarding the key elements of each environmental management system, including information relative to system performance—Chattanooga has implemented the following methods to maintain open channels of communications with interested parties in the community:
 - The Sustainability Committee, comprised of farmers, environmental interest groups, regulatory agencies, MBWWTP management, land application contractor management and staff, industrial users, and other interested parties, receives all relevant correspondence from the Chattanooga BMS and is convened annually.
 - Annual biosolids factsheet is published each February, and the annual newsletter is published each fall and distributed to all ISS department employees and interested parties. Both publications are also **posted on the city's website**.
 - Annual Performance Report is published by May 1 each year, and is distributed to all employees, Sustainability Committee

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members, and other interested parties, and posted on the city website.

- Plant tours for classes from local schools are scheduled year-round, and a feedback questionnaire intended to solicit constructive criticism is provided to each school group leader.
- Exhibits are displayed at Miller Plaza and First Tennessee Pavilion/Farmers Market as part of Public Works week during the third week of May each year.
- The verification and interim audit reports are posted on both the city website and the NBP website (biosolids.org); internal audit reports are also posted on the city website.

Progress toward Biosolids Program Goals & Objectives

Chattanooga established four overarching goals that are aligned with the NBP's four key outcomes, with several key objectives related to each goal. Quantitative measures indicative of progress to date (Key Performance Indicators) continue to be developed and reviewed by the Biosolids Management Team. Objectives and quantitative measures are revised each year.

- **GOAL** Safety Performance
OBJECTIVES & PROGRESS Establish a safety committee, define associated authority and evaluate effectiveness of committee annually over the next three years – in progress. Within the next eighteen months establish a new WRD Safety Manual with an employee Quick Reference Guide – in progress. Perform a safety program audit within eighteen months and establish a safety audit schedule for the next five years – not achieved.
- **GOAL** Relations with interested parties
OBJECTIVE & PROGRESS Solicit input from interested parties and evaluate annually the incorporation of that input over the next three years – in progress.
- **GOAL** Quality Management Practices and Regulatory Compliance in Biosolids
OBJECTIVE & PROGRESS Within two years evaluate the cost effectiveness of City's biosolids production program.

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recommend any alternatives to continue a BMS cost effective process – in progress. Within five years, implement alternatives recommended for cost effectiveness of biosolids production – in progress.

- **GOAL** Energy Performance

OBJECTIVE & PROGRESS Continue to seek out and evaluate annually the potential for electrical saving projects and reduce usage – in progress. Continue to seek out and evaluate annually the potential for gas saving projects and reduce usage – in progress. Continue to seek out and evaluate annually the potential for water saving projects and reduce usage – in progress.

MANAGEMENT SYSTEM DYNAMICS & EFFECTIVENESS REVIEWS

Review of the management system dynamics and outcomes is intended to verify that the biosolids management system is functioning effectively and generating positive outcomes and that as the program matures it implements the changes brought about through the continuous improvement processes.

Significant Changes

The following personnel changes occurred over the last year at the Moccasin Bend facility: Jeff Rose was appointed to the permanent position of Deputy Director-Waste Resources Division. BASF replaced Nalco as Polymer supplier for biosolids dewatering. Denali replaced Synagro as the land application contractor for biosolids. There was an equipment/technology change from Chlorine to Sodium Hypochlorite.

Revisions to the Management System and Related Documentation

No structurally significant revisions other than the personnel and equipment/technology changes noted above have been made in the Chattanooga Biosolids Management system since the previous audits. No edits for clarification and specificity have been made in the Manual to reflect correctly the Chattanooga management system.

- City Of Chattanooga BMS Manual Section 1.2, Authorizations, still lists Alice Cannella as Director – Waste Resources Division
- City Of Chattanooga BMS Manual Appendix H, Letter of Understanding, lists the biosolids land application contractor as Synagro.

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Examination of Outcomes

The Chattanooga biosolids management system strives for continuous improvement in how biosolids activities are conducted and how those activities promote the four key outcomes.

Environmental Performance

The Modifications so that all mesophilic digester boilers are able to use digester gas as an energy source continue, and the usage target for the digester gas was exceeded.

Implementation of the Strategic Energy Management Plan in the form of more efficient lighting, occupancy sensors, and other energy saving measures has resulted in reduction of the plant's energy costs and carbon footprint.

Quality Management Practices

In 2015, the City Of Chattanooga successfully met the Platinum Level requirements for the NBP BMP.

The biosolids management practices used in 2015 were consistent with the National Manual of Good Practice.

The Biosolids Management Team approved and instituted a FOR (Farm Operations Report) that communicates the safety, quality, and amount of biosolids applied to a farm, which is now issued at the end of each month. This increased communication, coupled with the newly developed biosolids satisfaction survey, creates a new avenue of input.

As a result of the solids economics study, one of the goals and objectives of the Biosolids Management Team, alternatives are being considered for process changes and rehabilitation to improve the quality of biosolids, by eliminating the need for lime, capturing more digester gas, or possibly producing Class A product.

Regulatory Compliance

Once again, in 2015, Chattanooga received no NOVs or violations of the federal 503 regulations in association with its biosolids management program.

The Biosolids Management Team is working with TDEC to improve the new biosolids general permit in the area of mineralization where they provided additional biosolids testing in the interest of preventing nutrient run-off from staging locations.

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Public Perception

Denali, the City's new biosolids land application contractor, created an Awareness and Acceptance Program designed to establish and maintain a proactive public communication and education program that provides comprehensive information about the beneficial use of biosolids on area farmland. The program includes a procedure for receiving, responding, and documenting inquiries from interested parties and defines a process for assuring timely response to those inquiries. In addition, input from tour groups, outreach programs, and interested parties is 93% positive.

The City's Biosolids Coordinator utilized email to address environmental and other concerns about biosolids staging and land application in Pelham County, offering interested parties an opportunity to voice their concerns during the internal audit process. Although one interested party copied his email to social media, including contact information, none of the interested parties bothered to contact him or the internal audit team.

Biosolids Policy Commitments

The Chattanooga Biosolids Management Policy remains as approved in 2007. The Policy includes a commitment to follow the principles of the NBP Code of Good Practice.

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Appendix

Documents Reviewed

Pretreatment Standard Operating Procedures
Administration Standard Operating Procedures
Biosolids Standard Operating Procedures
Collection System Standard Operating Procedures
Liquids Operations Standard Operating Procedures
Maintenance Standard Operating Procedures
Safety Standard Operating Procedures
Maintenance Job Safety Briefings
WRD Filter Press Operator Training Checklists
Solids Operations Standard Operating Procedures book
Laboratory Standard Operating Procedures Master List & book
Laboratory Employee Training checklist
Denali Awareness and Acceptance Program
Denali Daily Vehicle Analysis Report
Denali Biosolids Spill Response Plan
Denali Biosolids Handling Meeting Agendas for 2015
2015 Chattanooga BMS Management Team meeting minutes
Chattanooga BMS Management Team agendas
RFP and Phase #1 Report for Economic Analysis and Planning of Solids Operations for MBWWTP
MBWWTP BMS Training Log
2015 BMS Inquiries Log
2015 BMS Complaints Log
BMS Emergency Preparedness & Response Plan (6/29/15)
2015 BMS KPI log
MBWWTP BMS Information Stations
Management of Change form-State of TN Biosolids Land Application Permit (1/3/14)
State of TN Biosolids General Permit
Weekly Reports of 503 Laboratory Analysis
Monthly Biosolids Characteristics Reports
MBWWTP BMS Training Short Quiz
Material Matters Mineralization in Stored Material Memo to Matthew Snyder
List of Biosolids Sites under NOC as of August 19, 2015
MBWWTP Farm Operator Reports for 2015
TN House Bill 1131
MBWWTP Storage Summaries 2015
MBWWTP Scale Data for Denali Trucks sorted by Land Application Sites
MBWWTP Out of State Notifications to NPDES Permitting and Enforcement Branch

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MBWWTP NOI for Land Application of Biosolids to TDEC
KY/TN WEA Bill Report – 2016 Session
MBWWTP Management of Change Forms 2015
MBWWTP Biosolids Sustainability Committee Meeting Agendas 2015
MBWWTP Plant Meter Readings 2014 – 2015
ESO Recommendations for Budget Consideration (Updated 12/16/14)
NPDES Permit No. TN0024210
MBWWTP 2011-14 Biosolids Performance Reports
NANI January 2015
Survey Monkey Comments
BMS Land Data Sheet
Green Infrastructure Program Plan for CSS Basins EPA Approved Submittal
Pump Station Operation Program EPA Approved Submittal
Sanitary Sewer Evaluation Study Work Plan EPA Approved Submittal
Emergency Response Plan EPA Approved Submittal
FOG Management Plan EPA Approved Submittal
Pump Station Preventative Maintenance Program EPA Approved Submittal
Process Controls Program EPA Approved Submittal

Reference Documents

City of Chattanooga BMS Manual and Appendices
City of Chattanooga Biosolids Management Policy Statement
City of Chattanooga WRD Employee Health & Safety Handbook
TDEC Guidelines for the Land Application and Surface Disposal of Biosolids May 2010
NBP Biosolids EMS Guidance Manual
NBP Manual of Good Practice & Code of Good Practice
NBP Third Party verification Auditor Guidance
Reports from previously conducted independent third-party and internal audits

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List of Participants

Mike Patrick	Director-Waste Resources Division, City of Chattanooga
Jeff Rose	Deputy Director-Waste Resources Division, City of Chattanooga
Sandy Barbee	Sewer Project Coordinator-City of Chattanooga ISS
Brian Lessmann	Plant Manager-City of Chattanooga ISS
Joe Miller	Occupational Safety Specialist-City of Chattanooga ISS
Jimmy Spence	Maintenance Supervisor-City of Chattanooga ISS
Marty Knight	Solids Operations Supervisor-City of Chattanooga ISS
Rick Tate	Pretreatment Supervisor-City of Chattanooga ISS
Charles Thomas	Liquids Operations Supervisor-City of Chattanooga ISS
Paul Patterson	Laboratory Manager-City of Chattanooga ISS
Charlotte Hicks	General Supervisor-City of Chattanooga ISS
Eric Sluder	Collection Systems Engineer-City of Chattanooga ISS
Randy Taylor	Plant Engineer-City of Chattanooga ISS
Karen Styers	Administrative Support Specialist-City of Chattanooga ISS
Brian Martin	Solids Operator 2-City of Chattanooga ISS
David Lawson	Solids Chief Mechanic-City of Chattanooga ISS
Jimmy Watts	Liquids Operator-City of Chattanooga ISS
Debbie Shelley	Scalehouse-City of Chattanooga ISS
Matt Schiesser	Pump Station Operator 3-City of Chattanooga ISS
Monty Webb	CSO Operator-City of Chattanooga ISS
Aaron Loyd	Project Manager-Denali
Chad Rains	Truck Driver-Denali
Heidi George	Environmental Manager-Denali
Chris Cagle	Principal, TN Middle School, Bledsoe County
Ryan Baty	Interested Party-Alabama Department of Environmental Management
Jake McCrary	Solids Operator – City of Chattanooga ISS
Gabe Dixon	Solids Operator - City of Chattanooga ISS