BIOSOLIDS EMS — ELEMENT 13.0
MONITORING AND MEASUREMENT

REVISION	EFFECTIVE DATE	APPROVAL SIGNATURE
13	October 06, 2021	

PURPOSE

Element 13.0 outlines the systems that the City of Fort Worth has implemented to assure compliance with applicable legal and self-imposed requirements, measure biosolids program performance at Critical Control Points, track progress toward achieving biosolids program goals and objectives, and verify the effectiveness of the Environmental Management System (EMS) procedures and activities.

SCOPE

Routine monitoring and measurement activities provide an organization with analytical data to verify compliance with regulatory requirements, to assess performance with operational targets, and to evaluate conformance with BMP standards. Element 13.0 describes how the City of Fort Worth quantitatively and qualitatively monitors and measures progress toward each EMS goal and objective, and evaluates the effectiveness of procedures at all levels of the Biosolids Management Program (BMP). Standard operating procedures and key measurement processes are used by City staff and contractors to properly perform, verify, document and update all biosolids management activities performed at every Critical Control Point (CCP) throughout the biosolids value chain.

KEY WORDS

- Biosolids Value Chain
- Continual Improvement
- Critical Control Points
- Environmental Performance
- Monitoring and Measurement
- Total Quality Management Principles

RESPONSIBILITY

The Biosolids EMS Manager (Plant Operations), Biosolids EMS Coordinator (Plant Operations), Superintendent (Plant Operations-Wastewater), Assistant Superintendents (Plant Operations-Wastewater and Maintenance), Pretreatment Manager (Customer Care), and Biosolids Manager (Contractor) are responsible for establishing, maintaining and documenting all procedures and practices for biosolids management activities to accomplish the following objectives: 1) Ensure compliance with applicable legal and other requirements; 2) Measure biosolids program performance at critical control points; and 3) Track progress toward achieving biosolids program goals and objectives. Each employee (City and Contractor) working within the Biosolids Value Chain is responsible for completing work in a professional and ethical manner, as outlined in standard operating procedures, contracts, and service agreements.

PROCEDURE

Regulatory Monitoring

The minimum monitoring requirements for VCWRF (pretreatment standards, influent flow, effluent and discharge flow, downstream flow, sludge processing and quality, etc.) are presented in the Texas Pollution Discharge Elimination System (TPDES) Permit, the Texas Administrative Code (TAC) and Code of Federal Regulations (CFR) referenced in Element 4.0—Legal and Other Requirements.

City

The City monitors and measures biosolids regulatory compliance, goals and objectives, process equipment and activities throughout the biosolids value chain. As discussed in Element 4.0—Legal and Other

Requirements, the City regularly monitors a variety of information sources to ensure that legal and other requirements are appropriately interpreted, updated, communicated, implemented and documented.

Contractor

The City also requires the Biosolids Contractor to monitor proposed biosolids regulatory operations, processes and activities, in addition to TPDES permit requirements specified in contract documents. The EMS Master Table in Element 3.0—Critical Control Points, lists the frequency of monitoring and measurement activities associated with critical control points in the biosolids value chain and the documentation requirements in Element 12.0—Documentation.

Internal Monitoring

The City is committed to the Total Quality Management Principles established by the National Biosolids Partnership (NBP) in the *Manual of Good Practice*. Training is provided to enable employees to competently perform their assigned tasks and duties in standard day-to-day activities and in abnormal and emergency situations as discussed in Element 8.0—Training and Element 11.0— Emergency Preparedness and Response. Standard operating procedures (SOPs) provide employees with a consistent work standard and a mechanism to monitor the quality of the work being performed. In addition, the City of Fort Worth uses employees who specialize in Quality Assurance and Quality Control (QA/QC) to verify City and contractor sampling protocol, laboratory procedures and analytical data. Monitoring and measurement is a critical component to ensure compliance with roles and responsibilities (Element 7.0), operational controls (Element 10.0) and legal and other requirements (Element 4.0).

Process Monitoring

The City and Contractor use SOPs involving equipment and process controls, to ensure that procedures are performed correctly in the proper sequence, and that information is properly logged, recorded and verified as needed (Element 12.0). SOPs define the monitoring points and procedures for each critical control point within the biosolids value chain (Element 3.0).

City

The City monitors and measures wastewater and biosolids treatment processes, operations and activities throughout the biosolids value chain. The City has established SOPs for biosolids quality and monitoring activities and for VCWRF process monitoring. Appendix 13.A contains copies of monitoring forms or datasheets that are specific to the biosolids program. Appendix 13.B includes copies of the Daily Process Control Worksheets used by VCWRF employees for monitoring and measuring wastewater treatment processes at the facility.

Contractor

The City requires contractors to monitor biosolids operations and processes, and to comply with legal and other requirements specified in contract documents. The contractor is responsible for developing, maintaining and updating SOPs for EMS, TPDES permit, contract and other document requirements.

Odor Control Plan

The City of Fort Worth TPDES permit requires the City and biosolids contractor to:

- Identify nuisance odors
- Develop odor control options
- Evaluate and select odor control mechanisms
- Implement corrective actions, as needed.
- Maintain appropriate documents and records (Daily Odor Log, Monthly Schedule of Planned Land Application Sites, Site Schedules, Complaints Records, etc.)

Adverse Weather and Alternative Plan

The City's TPDES permit prohibits land application of biosolids to land that is flooded, frozen or snow-covered to prevent material from entering wetlands or other waters in the State. Biosolids may not be applied during rainstorms or during periods in which surface soils are water-saturated, and when pooling of water is evident on a land application site. An Adverse Weather and Alternative Plan is required to prevent biosolids from blowing or running off site boundaries or into surface waters. When adverse weather, field preparation delays, or access road limitations occur, The Biosolids Manager (Contractor) will consult the Biosolids Manager (City) and determine whether to use an alternative site or cease application. The Biosolids Contractor must notify TCEQ and City staff of any operational change(s) and provide a revised land application schedule. If all application sites have been impacted by adverse weather, biosolids will be stored at the sludge only landfill (SOL). If less than 50% storage capacity remains available at the SOL, the biosolids contractor will send the material to the landfill.

Land Application Monitoring

The City and Contractor monitor and measure biosolids activities at land application sites. City employees conduct inspections daily when land application occurs and complete a Field Observation Report (Appendix 13.A). The report includes information about site and weather conditions, buffer zones, transport vehicles and haul road conditions. If Class B setbacks are used, the distance(s) from surface water is documented on the report. When the Biosolids Contractor completes land application at a site or moves to a different site, City staff conduct a close-out inspection and complete a Close-Out Site Visit form (Appendix 13.A). An olfactometer is used to quantify odor intensity during inspections, close-out visits and complaint investigations. An Odor Monitoring-Field Data Sheet (Appendix 13.A) is used to record and document quantitative and qualitative odor monitoring results. See SOPs BSLD 01.001, BSLD 01.002, and BSLD 07.002 for site inspection, close-out and complaint investigation procedures. Refer to SOP BSOD 04.001 for land application procedures at the Sludge Only Landfill (SOL).

Notification of Land Application Activities

Before land application begins at a site, the Biosolids Contractor will notify local officials (e.g. county commissioners) of the project's estimated start and completion dates. The Biosolids Contractor will also send a land application schedule to the Texas Commission on Environmental Quality (TCEQ) regional office by the 21st calendar day of each month preceding land application. If the schedule is revised in response to inclement weather, operational issues, or any other reasons, the regional TCEQ office must be promptly notified. Refer to TPDES Permit No. WQ0010494013 and SOP-BSLD 02.001 for notification procedures.

Water Department – Key Performance Indicators

Each month (or other specified interval), all City departments must report to the City Manager's Office on key performance indicators (KPI) associated with their operations. The KPIs cover different "service areas" associated with a variety of activities performed by each department. Service areas include (but are not limited to) customer satisfaction, product quality and operational optimization. KPIs help the City make strategic decisions on allocating resources and making improvements to areas that are not performing up to established standards.

Goals and Objectives

Biosolids goals and objectives that support the Water Department Business Plan, are presented annually in the EMS Performance Report (Element 15.0), and reviewed by the EMS Management Team (Element 17.0). The Biosolids EMS Manager and Biosolids EMS Coordinator track the progress of the goals and objectives each quarter and update Element 5.0-Appendix 5a accordingly.

Management Review

The EMS Management Team meets annually to review the effectiveness of the biosolids goals and objectives, discuss corrective action notices, verify legal and other requirements, evaluate EMS performance, update critical control

points, assess public outreach efforts, formulate new biosolids goals and objectives for the upcoming budget year and complete other functions as described in Element 17.0.

Audits

The City of Fort Worth conducts an internal audit each year to analyze the Biosolids Management Program and verify that EMS policies, requirements, goals and objectives have been accomplished in an effective manner. In addition, external interim and verification audits are completed by a third-party auditor to determine if the EMS program is functioning effectively and continuing to meet NBP expectations and requirements (Element 16.0). Internal and external audit reports are reviewed by City staff and the EMS Management Team and posted on the City website.

REFERENCES

- BMP Guidance Manual, (NBP, June 2011)
- Code of Good Practice, (NBP, June 2011)
- NBP Third Party Auditor Guidance (NBP, August 2011)
- VCWRF SOPs: VCWRF Library

EMS Cross References

- Element 3.0 Critical Control Points
- Element 4.0 Legal and Other Requirements
- Element 5.0 Biosolids Goals and Objectives
- Element 7.0 Roles and Responsibilities
- Element 8.0 Training
- Element 10.0 Operational Control of Critical Control Points
- Element 11.0 Emergency Preparedness and Response
- Element 12.0 Documentation and Document Control
- Element 15.0 Biosolids Program and EMS Performance Report
- Element 16.0 EMS Internal Audit
- Element 17.0 Periodic Management Review of Performance

ATTACHMENTS

- Appendix 13.A
- Appendix 13.B

REVISION HISTORY

Revision #	Date	Revision Description
13	10/06/2021	Added Notification of Land Application Activities section, updated attachments section
12	09/21/2018	Update to references
11	07/26/2016	Reference to Odor Control Plan and Adverse Weather and Alternative Plan added, updates to procedures.
10	10/06/2014	Referenced biosolids SOPs in Process Monitoring and Land Application Monitoring sections
09	08/05/2013	Update references and procedure, added attachments list
08	04/18/2012	Update procedures
07	11/16/2010	Update responsibilities, references, and procedures for goals and objectives
06	07/20/2009	Updated (Appendix 13b) Daily Process Worksheets
05	05/15/2008	Audit (YR2) 2007
04	06/29/2007	Audit (YR1) 2006
03	07/08/2005	Revised Biosolids Goals tracking procedure per Phase II Audit
02	11/29/2004	2004 Issue
01	10/01/2004	Approval Draft
SR	01/30/2004	Issued for Status Review

Observation Report
Close-Out Site Visit Form
Odor Monitoring-Field Data Sheet
Biosolids Percent Solids Data Sheet
SOL Daily Odor Monitoring Form
Biosolids Application at the Sludge Only Landfill Checklist
Land Application of Biosolids at the SOL-Monitoring Form

Daily Process Control Worksheets