



Wastewater Plant Biosolids BMP Internal Audit Report

City of Richmond, Virginia
Wastewater Treatment Plant

The Wastewater Treatment Facility operates along the south bank of the James River. The facility is permitted to treat 45 MGD dry weather flow and a minimum of 75 MGD wet weather flow. Richmond's Wastewater Treatment Facility serves customers in the City, Henrico, Chesterfield, and Goochland counties. The facility is one of the largest of its kind in Virginia. The Wastewater Utility also operates and maintains 1,500 miles of sanitary sewer, pumping stations, 38 miles of intercepting sewer lines, the Shockoe Retention Basin and McCloy Tunnel, and operates the combined sewer overflow (CSO) control program. The facility has Pretreatment, Laboratory, Technical Services, Engineering, and Financial/Administrative sections to support plant operations and maintenance.

Audit Performed By: **Wastewater Plant Internal Audit Team**
- Donald Carter - Management Analyst Senior & Lead Auditor
- Barbara Jackson - Plant Operations Supervisor Senior & Internal Auditor

Audit Dates: **November 9th 2020**

Report Date: **November 10th, 2020**

References: **NBP BMP Elements
National Manual of Good Practice for Biosolids
NBP – Third Party Verification Auditor Guidance – August 2011
Wastewater Plant Biosolids Management Program (BMP)**

List of Auditees: **Rosemary Green - Deputy Department Director, Senior
Nouredine Ezzineelamghari - EMS Coordinator
Faheem Abdul-Wahhaab - Plant Operations Supervisor
Ed Edmondson - Plant Operations Superintendent
Eric Whitehurst - Environmental Compliance Officer
Cordell Hayes - Program Manager (Maintenance)
Avis Purrington - Chief Chemist (Laboratory)
Elmore Sams, Willie Whitaker, Ron Marlborough - Chief Operators
Biosolids Truck Driver - Nutriblend
Various Plant Employees**

Introduction: **The Internal Audit Team investigated whether the City of Richmond's Wastewater Treatment Plant's BMP Biosolids System supports improvements in four key outcome areas. Those areas are: Quality Management Practices, Relations with Interested Parties, Regulatory Compliance & Environmental Performance. The Internal Audit Team verified those areas by performing the following: Document and Records Review, Interviews & Direct Observation.**

Scope & Objectives: **The Audit Scope applies to the entire Biosolids value chain and the BMP. Our objective was to determine whether the City of Richmond's Wastewater Treatment Plant is effectively meeting its Biosolids Management Policy, program requirements, program goals and objectives.**



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<u>Methodology:</u>	We followed the guidelines provided in the NBP Third Party Verification Auditor Guidance Manual. We reviewed each of the BMP Elements and determined if they conformed to the NBP Elements for an BMP. We used a Question Checklist Document to cover all of the BMP Elements. The Questions came from the NBP Third Party Verification Auditor Guidance Manual (August 2011 Edition). We also conducted some personal interviews and field observations (with pictures).
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<u>Overall Evaluation:</u>	Based on our Internal Audit Results, we feel that the City of Richmond's Wastewater Treatment Plant is in conformance with the major components of the BMP program.
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Element 1: Documentation (BMP Manual)	
Finding:	The Internal Audit Team agrees that Element 1 - Documentation is in Conformance. The Biosolids Team has prepared a well written and thorough Manual. The Team has a Hard Copy as well as a Electronic Copy on the common P: Drive in the BMP - Biosolids folder.
	Continue to regularly update the BMP Manual. Make sure the BMP Manual is reviewed in the calendar year that the Audit is performed. (Internal & External).

Element 2: Biosolids Management Policy	
Finding:	The Internal Audit Team agrees that Element 2 - Biosolids Management Policy is in Conformance. The Public Utilities Deputy Department Director in consultation with the WWTP Superintendents and Biosolids Supervisor have established a good solid and compliant Biosolids Management Policy that commits the City to the principles of conduct set forth in the Code of Good Practice. The Deputy Department Director signed the BMP Policy on October 2020.
	No formal recommendation other than continuous improvement.

Element 3: Critical Control Points	
Finding:	The Internal Audit Team agrees that Element 3 - Critical Control Points is in Conformance. The Critical Control Points are regularly reviewed, updated and tracked in a Table. There were no major changes in 2020 to operations that would impact the CCP.
Commendation:	Electronic files are well organized, continue to organize Electronic Files with a regimented File Naming Convention so that they are easy to find.

Element 4: Legal and Other Requirements	
Finding:	The Internal Audit Team agrees that Element 4 - Legal and Other Requirements is in Conformance. The Legal and other Requirements are regularly reviewed, updated and tracked in a Table. The Deputy Department Director & Operations Superintendent II are responsible for identifying & tracking the requirements.
	Continue to use the formal communication method to update the Biosolids Team of any Legal and other Requirements that impacts the Biosolids Value Chain.



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Element 5: Goals and Objectives for Continuous Improvement	
Finding:	The Internal Audit Team agrees that Element 5 - Goals and Objectives for Continuous Improvement is in Conformance.
Opportunity for improvement:	The Maintenance Program Manager was available for an interview with the Internal Auditors, Recommend to continue the Quarterly Maintenance KPI Review with the Maintenance Program Manager to cover - 1.) Ratio of Preventive vs Corrective Work Orders. 2.) Average Days to close a Work Order. 3.) Work Order Backlog. Regularly review the S.M.A.R.T. Goal criteria.

Element 6: Public Participation Planning	
Finding:	The Internal Audit Team agrees that Element 6 - Public Participation Planning is in Conformance. Nutriblend assists in this Element and the goals are communicated thru the City Website, Annual Reports and Utility Review. The new City Website had been updated.
No formal recommendation other than continuous improvement.	

Element 7: Roles and Responsibilities	
Finding:	The Internal Audit Team agrees that Element 7 - Roles and Responsibilities is in Conformance. Roles and Responsibilities are documented in a table. Sufficient resources, funds and technical skills have been allocated to the Biosolids BMP.
Opportunity for improvement:	Make sure that all of the Chief Operators are fully aware and involved in the BMP program. They should fully understand their Role & Responsibilities in relation to the BMP Program.

Element 8: Training	
Finding:	The Internal Audit Team agrees that Element 8 - Training is in Conformance. The BMP Team has an Electronic Copy of all completed Training on the common P: Drive in the BMP - Biosolids folder.
Opportunity for improvement:	There are only 2 internal auditors available. There is now (1) additional backup Auditor. Recommend training (2) additional BMP Internal Auditors. That would equal (2) regular internal auditors + (1) as backup once the current auditors retire. Nouri should have been part of this Internal Audit.
Opportunity for improvement:	Training should include all new & reassigned employees. Training should adapt to all COVID-19 guidelines, so that you can still accomplish the training goals.
Opportunity for improvement:	Recommend additional interested WWTP Employees be sent every calendar year to formal EMS Training (TBD). This can include BMP Team Members and other interested WWTP Employees.

Element 9: Communication and Outreach	
Finding:	The Internal Audit Team agrees that Element 9 - Communication and Outreach is in Conformance. This is accomplished thru the City's Communication Division and the efforts of Nutriblend. The communication efforts need to be expanded and delivered regularly.
Opportunity for improvement:	Continue to regularly communicate with Nutriblend & the City's Communication Division and thoroughly understand their efforts. The entire Communications Staff can be utilized as necessary without relying solely on the Communication Manager.

Element 10: Operation Control of Critical Points	
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Finding:	The Internal Audit Team agrees that Element 10 - Operation Control of Critical Points is in Conformance. SOP's are complete for Dewatering. Preventive and Corrective Maintenance activities are handled by Mainsaver (CMMS Maintenance System).
Opportunity for improvement:	Recommend monitoring Open Work Orders that are old and on Critical Equipment that needs to be fixed (ongoing & tie to KPI's).



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Element 11: Emergency Preparedness and Response	
Finding:	The Internal Audit Team agrees that Element 11 - Emergency Preparedness and Response is in Conformance. We have SOP's for Emergencies. Nutriblend also has a spill response manual and equipment for their emergencies.
Opportunity for improvement:	Make it clear thru Training that all personnel on duty understand and react to spills immediately (ongoing). New & reassigned employees must be included.
Element 12: BMP Documentation, Document Control & Record Keeping	
Finding:	The Internal Audit Team agrees that Element 12 - BMP Documentation, Document Control & Record Keeping is in Conformance. All relevant Documents are written and available on the P:\ Drive in the BMP - Biosolids folder.
Opportunity for improvement:	Encourage that all WWTP employees request access to the "P" Drive. This would be a Read-Only Access to the BMP Folder. The request needs to be routed thru the employees supervisor. (SAPR Form Requested from Automation Coordinator). Do a field audit to confirm that all employees have access.
Element 13: Monitoring and Measurement	
Finding:	The Internal Audit Team agrees that Element 13 - Monitoring and Measurement is in Conformance. Good housekeeping and proper Sampling Procedures must be followed to also insure good samples are provided. Monitoring and Measurement is captured on LIMS, OP10 and various Excel Spreadsheets.
Major Non-Conformance	HOUSEKEEPING - Monthly plant walk-around was done only once, stay on top of any Housekeeping Issues - Year Round. Develop a formal Housekeeping Plan and use it. Replace Sample Containers when dirty and replace all Sample Containers annually. Make sure Sample Refrigerators are kept clean. Housekeeping continues to be a yearly subject of discussion. <u>WE CAN DO BETTER!</u> This should be a coordinated effort by Operations & Maintenance. <u>WE HAVE NOT IMPROVED IN THIS AREA AND THIS IS A MAJOR NON-CONFORMANCE.</u>
Element 14: Nonconformance - Preventive & Corrective Action	
Finding:	The Internal Audit Team agrees that Element 14 - Nonconformance - Preventive & Corrective Action is in Conformance. The Internal Auditors verified that procedures are being followed and corrective actions are initiated when required. Auditors reviewed a couple of Corrective Action Reports.
Opportunity for improvement:	All Corrective Action Documents must be reviewed by at least one of the Internal Auditors. There is a Signature & Date Box on the Form.
Element 15: Biosolids Management Program Report	
Finding:	The Internal Audit Team agrees that Element 15 - Biosolids Management Program Report is in Conformance. The BMP Team has completed the 2019 Report.
	No formal recommendation other than continuous improvement.
Element 16: Internal BMP Audit	
Finding:	The Internal Audit Team agrees that Element 16 - Internal BMP Audit is in Conformance. The Internal Audit Checklist helped us verify that the Internal Audit had covered all 17 Elements. Field Audits and Personal Interviews supported the findings.
	Refer to training element



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Element 17:	Periodic Management Review of Performance
Finding:	The Internal Audit Team agrees that Element 17 - Periodic Management Review of Performance is in Conformance. The BMP Team did have a meeting with the Deputy Department Director and several topics were discussed. The Internal Auditors verified this took place and performed a Phone Interview as well.
	No formal recommendation other than continuous improvement.

Internal Audit Conclusion
<p>The Internal Audit Team reviewed the Biosolids BMP Manual and all of the 17 Elements. We have concluded that the Biosolids BMP System is in compliance. The current BMP Supervisor is knowledgeable and dedicated to the program. There was 1 Major Non-Conformance, 1 positive Commendation and 10 Opportunities for Improvements. We would like to point out some areas that continue to be a weakness and continued point of discussion. See below:</p>
<p>1.) <u>HOUSEKEEPING - AGAIN YEAR AFTER YEAR - WE CAN DO BETTER!</u> - Every year this becomes a point of discussion on how to accomplish all year. We have Work Orders in place, but the execution of those Work Orders needs to improve. This should be a coordinated plant wide effort!.</p>
<p>2.) <u>TRAINING - ELEMENT 8 - TRAINING</u> - This is an ongoing never-ending process. The BMP Program needs to constantly seek out and schedule BMP Training opportunities. The more training opportunities that can be accomplished equals a more informed employee base that can become an asset to the program. The current Internal Auditors have about <u>1 Year left</u> before retirement. There needs to be continuity planning to train additional Internal Auditors.</p>
<p>3.) <u>COMMITMENT</u> - We recognize that the upper management is committed to the BMP Program and we suggest that active involvement be expanded to include activities throughout the year. We would suggest a proactive approach instead of a wait and see approach (React when asked). One of the BMP major goals includes the use of Maintenance KPI's to improve the Biosolids Program. We need to continue to place an increased emphasis on achieving KPI goals. <u>REMEMBER ACTIONS SPEAK MUCH LOUDER THAN WORDS.</u></p>
<p>4.) <u>INTERVIEWS & FIELD OBSERVATIONS</u> - Barbara Jackson also conducted numerous field interviews and observations. This effort was accompanied by numerous photos for documentation. This extra effort greatly enhanced the thoroughness on the internal audit and helped evaluate the entire BMP program compliance.</p>