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.

**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.

**Audit Performed By:**
Wastewater Plant Internal Audit Team
- Donald Carter - Project Management Analyst & Lead Auditor
- Barbara Jackson - Shockoe Supervisor & Former BMP Supervisor

**Audit Dates:** November 14th & 15th, 2016

**Report Date:** November 17th, 2016

**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 Director
- Nouredine Ezzineelamghari - BMP Supervisor
- Clair Watson - Operations Superintendent II
- Ed Edmondson - Operations Superintendent I
- Eric Whitehurst - Environmental Compliance Officer
- Cordell Hayes - Program Manager - Facilities
- Audrey Brubeck - Laboratory Manager
- Elmore Sams & Willie Whitaker - Chief Operators
- Ben Young & Jacques Riley - Utility Operators
- Nutriblend - Land Application Contractor
- Donald Carter - CMMS Administrator - Maintenance Program
# Wastewater Plant Biosolids BMP Internal Audit Report

**City of Richmond, Virginia**  
**Wastewater Treatment Plant**

## Methodology:

<table>
<thead>
<tr>
<th>Finding</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td></td>
</tr>
</tbody>
</table>

## Overall Evaluation:

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.

## Element 1: Documentation

<table>
<thead>
<tr>
<th>Finding</th>
<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>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. The Manual was recently approved by the Deputy Director (Rosemary Green).</td>
<td>Continue to regularly update the BMP Manual.</td>
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</tbody>
</table>

## Element 2: Biosolids Management Policy

<table>
<thead>
<tr>
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<th>Recommendation</th>
</tr>
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<tbody>
<tr>
<td>The Internal Audit Team agrees that Element 2 - Biosolids Management Policy is in Conformance. The Biosolids Management Policy follows the guidelines set forth by the NBP Code of Good Practice and is communicated to employees, contractors and interested parties thru safety meetings, posters and Utility Review.</td>
<td>No formal recommendation other than continuous improvement.</td>
</tr>
</tbody>
</table>

## Element 3: Critical Control Points

<table>
<thead>
<tr>
<th>Finding</th>
<th>Opportunity for improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>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.</td>
<td>Continue to organize Electronic Files with a regimented File Naming Convention so that they are easy to find &amp; organize.</td>
</tr>
</tbody>
</table>

## Element 4: Legal and Other Requirements

<table>
<thead>
<tr>
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<th>Recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>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 Director &amp; Utility Plant Superintendant are responsible for identifying &amp; tracking the requirements.</td>
<td>No formal recommendation other than continuous improvement.</td>
</tr>
</tbody>
</table>
### 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:** Recommend regularly reviewing maintenance activities with the Maintenance Program manager - Ratio of Preventive vs Corrective Work Orders.

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### 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.

**Recommendation:** No formal recommendation other than continuous improvement.

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### 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.

**Recommendation:** No formal recommendation other than continuous improvement.

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### Element 8: Training

**Finding:** The Internal Audit Team agrees that Element 8 - Training is in Conformance.

**Opportunity for improvement:** Make sure new employees are trained. Always Document Training sessions and provide a Sign-In sheet. Involve the Chief Operators in the Training Process.

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### 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.

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### Element 10: Operation Control of Critical Points

**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 (Maintenance System).

**Opportunity for improvement:** Recommend monitoring Open Work Orders that are old and on Critical Equipment that needs to be fixed. (On-going).
| 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. |
| Recommendation: No formal recommendation other than continuous improvement. |

| 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. |
| Recommendation: Continue to organize Electronic Files with a regimented File Naming Convention so that they are easy to find & organize. |

| 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. |
| Opportunity for improvement: Stay on top of any Housekeeping Issues - Year Round. |

| 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. |
| Recommendation: No formal recommendation other than continuous improvement. |

| Element 15: Performance Report | **Finding:** The Internal Audit Team agrees that Element 15 - Performance Report is in Conformance. The BMP Team has completed the 2015 Report. |
| Recommendation: 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. |
| Opportunity for improvement: Formally train additional Internal Auditors. This provides additional resource. |
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 Director and several topics were discussed. The Internal Auditors verified this took place.

**Finding:**

Opportunity for improvement

Recommend that a dedicated resource be given for document & meeting management Administrative help. Have more than one Management Review meeting.

**Internal Audit Conclusion**

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. Great job this year! The new BMP Supervisor is knowledgeable and dedicated to the program. There are 8 Opportunities for improvement addressed.