



## **Biosolids Management Program Performance Report**

### **Introduction:**

#### **Purpose of the Report**

The Biosolids Management Program Performance Report is intended to provide an annual review of information regarding the focus and status of the ACUA's Biosolids Manual in regards to implementation, environmental and performance activities.

This report covers the following topics:

- I. BMP Manual & BMP Manual Tasks.
- II. Summaries of monitoring data and other measurements that demonstrate the performance of the ACUA biosolids program relative to established goals, objectives and regulatory requirements.
- III. Summaries of actions that have been taken on a voluntary basis.
- IV. A summary of audits.
- V. Contractor activities.
- VI. A summary of corrective actions.

#### **Summary**

In 2013, the ACUA formally implemented the Biosolids Management Program (BMP) Manual which documents the ACUA's biosolids process and helps to track the ACUA's progress towards reaching established goals and objectives. The BMP Team was able to complete the scheduled annual events outlined in the manual's Process Flow Checklist. Key outcomes or findings from these events include the following:

1. The quality of biosolids, expressed as total solids, has declined over the period. This creates a new objective under the goal to decrease incinerator fuel usage. A new SMART criterion has been set for incinerator fuel usage.
2. Eleven voluntary actions were executed for an opportunity in improving the BMP.
3. All regulated activities have met compliance requirements.
4. A noteworthy action under contractor activities includes the BMP training provided to the ACUA truck drivers responsible for the ash derivative from the biosolids process.
5. All required audits were performed during the period. A third party audit resulted in the August 2013 Gold recognition of ACUA's BMP. This achievement keeps ACUA on pace with the goal to eventually become Platinum recognized.
6. Corrective actions have been almost entirely the result of BMP Team or Audit activities. The general population needs to be engaged.

## **I. BMP Manual & BMP Manual Tasks**

### **A. BMP Manual**

The Biosolids Manual is the framework for documenting and organizing the seventeen elements of the NBP program for biosolids. The ACUA began developing the Biosolids Manual after the Biosolids Policy was adopted on November 17, 2011. Changes to the manual during the period did not include any major or functional changes. The changes which did occur were made voluntary as an opportunity for improvement. These changes included title changes for personnel, clearer identification of roles and responsibilities, re-aligning the required dates of tasks and more precise language regarding documentation.

The master copy of the Biosolids Manual is kept on file on the ACUA's Intranet. All elements and documents of the manual can be found electronically on the ACUA's Intranet or referenced on the [ACUA's website](#).

### **B. Reporting on Annual Biosolids Manual Tasks**

In 2014, the annual Biosolids Manual tasks included implementation and review of each critical control point (CCP) and the CCP tables of Element 3. A CCP is defined as any location, unit process, event, or activity throughout the biosolids value chain under the organization's direct control or influence that requires effective policies, programs, procedures, practices, monitoring and measurements to assure the biosolids activities meet legal, quality and public acceptance requirements and do not have undesirable environmental impacts. The CCPs include all biosolids management activities that are covered under applicable legal and other requirements. The review of the CCP tables included the simultaneous review of the associated standard operating procedures (SOPs), operational controls, monitoring and measurements, and environmental impacts associated with each CCP. In addition to the CCP Review, the Emergency Operating and Response Program – Wastewater Division was reviewed. During the report period, there were no changes to either the CCP table or the Emergency Operating and Response Program. Since the ACUA's start of the manual, the ACUA's Implementation Team has a schedule of tasks in place to ensure that the above items are reviewed on an annual basis.

## **II. Summaries of monitoring data and other measurements that demonstrate the performance of the ACUA biosolids program relative to established goals, objectives and regulatory requirements**

### **A. Progress Towards Meeting Biosolids Goals and Objectives**

The BMP team continued to work on all of the established goals and objectives:

- 1) Improve the BMP by 2017
  - a. Obtain NBP Platinum Certification
- 2) Reduce Biosolids Incinerator auxiliary fuel usage by 30% of base year 2010 by 2014
  - a. Improve ACUA dewatering sludge quality to greater than 30%.
  - b. Improve Customer sludge quality to greater than 16% Total Solids.
  - c. Improve biosolids incinerator controls.
- 3) Find a beneficial use of our waste streams by 2018
  - a. Monitor and Measure Beneficial Use of FOG (Fats, Oils and Greases) and Ash by 2014.
- 4) Find a reliable and efficient means to convey WAS centrate to the head of plant while eliminating redundant pumping and reducing electrical consumption by 50% by 2013

- a. Evaluate current infrastructure by September 2012
- b. Evaluate System Hydraulics by October 2012
- c. Design and specify new conveyance system by December 2012
- d. Bid and install new conveyance system by May 2013
- e. Develop new SOP and revise WPCII SOP by June 2013

**B. Summaries of monitoring data and other measurements that demonstrate the performance of ACUA biosolids program relative to established goals, objectives and legal requirements**

The goals and objectives related to the ACUA's BMP were developed by the Technical Assistant. The goals and objectives were tracked and progress reports were submitted to applicable departments. Also, input from interested parties regarding the goals and objectives were solicited by way of outreach, contact forms, and the ACUA's annual Earth Day on April 27, 2014.

- 1) Improve the BMP by 2017
  - a. Obtain NBP Platinum Certification

As a conclusion from the interim external audit conducted in July of 2014, it was determined that the ACUA has a strong Biosolids Environmental Management Program. The NSF lead auditor reviewed and approved the corrective action plans for each of the major and minor non-conformances identified during the interim audit and found that that implementation of the corrective actions associated with the major nonconformity was performed. Consequently the NSF auditor is recommending the issuance of the "Platinum Level Certification" with the acknowledgement that the full implementation of the corrective actions for the minor non-conformances will be accomplished according to the schedule proposed in the corrective action worksheets. It was further concluded by the auditor that he expected that the opportunities for improvement will each be addressed although they do not require formal closure.

In summary, the 2014 goal to achieve NBP Platinum Certification appears to have been accomplished.

- 2) Reduce Biosolids Incinerator auxiliary fuel usage by 30% of base year 2010 by 2014
  - a. Improve ACUA dewatering sludge quality to greater than 30%.

ACUA was unable to achieve this goal in the past year. The official total solids averaged less than 27% for the period, which is a decline from the previous year. Although some measurable improvement occurred later in the reporting period, it became obvious that the goal for 30% total solids needed a closer review. A new goal has been established based upon this situation. A display of the measurable data is included under the next section of this report, *Summary of New Goals & Objectives*.

- b. Improve Customer sludge quality to greater than 16% Total Solids.

ACUA was unable to fully achieve this goal in the past year. The frequency at which customer sludge quality was below 16% total solids did decrease during the period. This improvement appears to be the result of a new sampling program for all customer sludge, along with new contract language. The calculated annual fuel savings equate to \$1,957\*. A new goal for Year 2014/2015 will help specifically identify with numerically measurable criteria, the reduction in the frequency of customer sludge below 16% total solids. This to be used to assess and track performance improvements going forward. To improve customer sludge quality to greater than 16% Total Solids the ACUA has modified language in outside biosolids customer's contract to include:

1. Sludge Defined. For purposes of this Agreement, "sludge" shall be defined as the dewatered sludge of the processing of domestic sewage through a properly operated wastewater treatment plant. "Dewatered sewage sludge" shall be defined as sludge having a minimum concentration of 16% dry solids by weight and not less than 70% total volatile solids; and
2. The ACUA reserves the right to refuse any loads that are less than 16% Total Solids.

\* Based upon the difference in heating values associated with biosolids measured at 17% total solids versus 15% total solids.

- c. Improve biosolids incinerator controls.

The ACUA was able to replace the Venturi and Scrubber Impingement Trays, actuators and positioners on ambient air ports, modified hot air return air dampers, and inspect, calibrate, and evaluate incinerator emissions controllers in 2014. ACUA was unable to achieve this entire goal in the past year. However, ACUA has established a new goal for Year 2014/2015 which will help specifically identify with numerically measurable criteria to be used to assess and track performance improvements going forward. The ACUA biosolids incinerator controls will be improved by having Industrial Furnace replace the incinerator burner's electronics starting in March of 2015. No measureable improvement has been yielded to date.

- 3) Find a beneficial use of our waste streams by 2018
  - a. Monitor and Measure Beneficial Use of FOG (Fats, Oils and Greases) and Ash by 2014.

The ACUA went out for Request for Proposal (RFP) for this goal. The ACUA receives an average of 1,500,000 gallons per year of FOG. After receiving proposals it was determined that there is no market for the FOG that ACUA produces, so the ACUA will no longer be pursuing this goal as an option for beneficial use.

- 4) Find a reliable and efficient means to convey WAS centrate to the head of plant while eliminating redundant pumping and reducing the associated electrical consumption by 50%

The ACUA completed the evaluation of WAS centrate infrastructure by September, 2012. In October of 2012, the system hydraulics were evaluated. The design and specs for a new conveyance system were then developed in December of 2012. The new conveyance system was then bid and installed in May of 2013. To operate the system a new SOP and revised WPC II SOP was developed in June of 2013 to operate the system.

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The new system has eliminated redundant pumping and reduced head system requirements through the elimination of a low elevation well. The rated horsepower of the new system is 10-hP compared to the original 25-hP design. This 60% reduction equates to annual saving of \$9,855. These savings are based on the 2013 average electric cost of \$0.10/kw-hr.

- 5) All permitted activities have met requirements during the period. Associated documentation and reporting requirements have also met the standard. Some of the most relevant data has been included for demonstration of:
- a. Compliance with federal requirements for end use of biosolids

Atlantic County Utilities Authority Monthly Bio-Solids Metal Analysis														
Metal / Permit Limit	Arsenic (10 ppmw)		Cadmium (30 ppmw)		Chromium (70 ppmw)		Nickel (70 ppmw)		Mercury (5 ppmw)		Lead (300 ppmw)		Beryllium (10 ppmw)	
	Result ppmw	Percent of Limit	Result ppmw	Percent of Limit	Result ppmw	Percent of Limit	Result ppmw	Percent of Limit	Result ppmw	Percent of Limit	Result ppmw	Percent of Limit	Result ppmw	Percent of Limit
Jan-13	2.83	28.3%	3.97	13.2%	11.50	16.4%	10.60	15.1%	0.55	11.0%	26.90	9.0%	0.29	2.9%
Feb-13	4.81	48.1%	3.95	13.2%	12.80	18.3%	10.90	15.6%	0.34	6.8%	23.20	7.7%	0.29	2.9%
Mar-13	3.07	30.7%	2.34	7.8%	8.89	12.7%	8.86	12.7%	0.67	13.4%	19.30	6.4%	0.26	2.6%
Apr-13	4.19	41.9%	3.62	12.1%	14.00	20.0%	10.10	14.4%	0.51	10.2%	30.00	10.0%	0.25	2.5%
May-13	4.97	49.7%	4.37	14.6%	19.70	28.1%	11.80	16.9%	0.15	3.0%	33.90	11.3%	0.12	1.2%
Jun-13	7.75	77.5%	4.01	13.4%	19.90	28.4%	13.60	19.4%	0.32	6.5%	38.00	12.7%	0.24	2.4%
Jul-13	6.86	68.6%	5.52	18.4%	21.80	31.1%	14.60	20.9%	0.24	4.8%	44.40	14.8%	0.22	2.2%
Aug-13	5.85	58.5%	4.29	14.3%	20.70	29.6%	12.20	17.4%	0.42	8.4%	44.80	14.9%	0.10	1.0%
Sep-13	5.06	50.6%	2.62	8.7%	18.10	25.9%	11.20	16.0%	0.77	15.4%	29.60	9.9%	0.14	1.4%
Oct-13	8.21	82.1%	3.30	11.0%	18.30	26.1%	14.10	20.1%	0.45	9.0%	38.00	12.7%	0.22	2.2%
Nov-13	5.11	51.1%	2.69	9.0%	12.10	17.3%	11.20	16.0%	0.44	8.8%	27.50	9.2%	0.26	2.6%
Dec-13	4.91	49.1%	2.86	9.5%	12.40	17.7%	10.10	14.4%	0.43	8.6%	29.70	9.9%	0.28	2.8%
Jan-14	4.58	45.8%	2.98	9.9%	12.10	17.3%	11.70	16.7%	0.68	13.5%	50.60	16.9%	0.32	3.2%
Feb-14	5.68	56.8%	3.89	13.0%	13.50	19.3%	11.60	16.6%	0.34	6.7%	34.50	11.5%	0.37	3.7%
Mar-14	3.62	36.2%	2.15	7.2%	10.90	15.6%	9.32	13.3%	0.41	8.1%	22.30	7.4%	0.31	3.1%
Apr-14	5.78	57.8%	5.19	17.3%	16.00	22.9%	12.50	17.9%	0.29	5.9%	40.70	13.6%	0.41	4.1%
May-14	5.14	51.4%	4.15	13.8%	13.70	19.6%	11.60	16.6%	0.42	8.4%	34.50	11.5%	0.28	2.8%
Jun-14	7.28	72.8%	3.64	12.1%	16.80	24.0%	13.80	19.7%	0.81	16.2%	38.00	12.7%	0.24	2.4%
Jul-14	4.09	40.9%	2.64	8.8%	17.30	24.7%	15.10	21.6%	0.52	10.3%	37.00	12.3%	0.20	2.0%
Average	5.25	52.5%	3.59	12.0%	15.29	21.8%	11.84	16.9%	0.46	9.2%	33.84	11.3%	0.25	2.5%

- b. Compliance with emissions standards

Atlantic County Utilities Authority Air Emissions			
Air Contaminant	2013 (Tons/Yr); (1,000 Tons/Yr for CO2 only); (Lbs/Yr for TAPs only)		
	Actual	Permit Limit	Percent of Limit
CO	0.83	38.2	2.2%
NOx (Total)	8.55	72.1	11.9%
Pb	0	0.696	0.0%
PM-10 (Total)	5.2	18.1	28.7%
PM-2.5 (Total)	5.2	18.1	28.7%
SO2	0.07	11.5	0.6%
TSP	3.29	13.4	24.6%
VOC (Total)	0.04	5.17	0.8%

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- c. Compliance with future emissions standards known as MMMM limits. Note that LLLL limits displayed below would have to be met if ACUA would install a new multi-hearth incinerator in the future. Meeting those limits would require millions of dollars in added emissions controls.

Table 1: ACUA Incinerator "A", 2013 Stack Test Comparison							
Pollutant	MMMM Limit Existing MHF	Units	ACUA #1 Result		MMMM % of limit	LLLL Limit for NEW MHF	Result
Cd	0.095	mg/dscm@7%O2	0.0389	Pass	41%	0.0024	1621%
CO	3800	ppmvd @7%O2	2.25	Pass	0.10%	52	Pass
HCl	1.2	ppmvd @7%O2	0.25	Pass	21%	1.2	Pass
Hg	0.28	mg/dscm@7%O2	0.0468	Pass	17%	0.15	Pass
NOx	220	ppmvd @7%O2	90.05	Pass	41%	210	Pass
Pb	0.3	mg/dscm@7%O2	0.0992	Pass	33%	0.0035	2834%
CDD/CDF TEQ	0.32	ng/dscm@7%O2	N/A	N/A	N/A	0.045	N/A
CCD/CDF TMB	5	ng/dscm@7%O2	0.022	Pass	0%	0.0022	1000%
PM	80	mg/dscm@7%O2	29.75	Pass	37%	60	Pass
SO2	26	ppmvd @7%O2	0.71	Pass	3%	26	Pass

Table 2: ACUA Incinerator "B", 2013 Stack Test Comparison							
Pollutant	MMMM Limit Existing MHF	Units	ACUA #1 Result		MMMM% of limit	LLLL Limit for NEW MHF	Result
Cd	0.095	mg/dscm@7%O2	4.53E-03	Pass	5%	0.0024	189%
CO	3800	ppmvd @7%O2	1.65	Pass	0.04%	52	Pass
HCl	1.2	ppmvd @7%O2	0.16	Pass	13%	1.2	Pass
Hg	0.28	mg/dscm@7%O2	0.0565	Pass	20%	0.15	Pass
NOx	220	ppmvd @7%O2	24.72	Pass	11%	210	Pass
Pb	0.3	mg/dscm@7%O2	6.05E-03	Pass	2%	0.0035	173%
CDD/CDF TEQ	0.32	ng/dscm@7%O2	N/A	N/A	N/A	N/A	N/A
CCD/CDF TMB	5	ng/dscm@7%O2	0.103	Pass	2%	0.0022	4659%
PM	80	mg/dscm@7%O2	22.88	Pass	29%	60	Pass
SO2	26	ppmvd @7%O2	0.14	Pass	1%	26	Pass

## C. Summary of New Goals & Objectives

### 1. Determination of Strategy to Comply with New SSI Regulations Associated with Furnace A and B.

#### Objectives:

By November 1, 2014, WW staff to complete a report on the strategy to achieve compliance on meeting the proposed SSI regulations. The report shall include but not be limited to:

- Results of meeting with industry consultants and develop a strategy to achieve compliance to meeting the SSI regulations.

- Identification of technological upgrades to the furnace needed to achieve compliance especially the focus on the containment of fugitive ash.
- Presentation of an analysis regarding the cost benefit evaluation of retaining or decommissioning Furnace A since the furnace is used only when Furnace B is shut down routinely for twice annual service and other unexpected Furnace B repairs that occur during the year.

By November 15, 2014, present findings to Administration and make a recommendation for a plan of action and capital plan for implementation.

By March 1, 2015, implement plan of action based on recommendation and acceptance by Administration.

This goal achieves the following Key Outcomes as promoted by the NBP program:

Quality Management Practices – Notwithstanding the need for compliance to new regulations regarding fugitive ash, containment of ash has benefits to the overall operation as it relates to dust that permeates the entire facility. One obvious benefit is the ability to better housekeep the facility. More importantly, ash containment has a significant impact on the health, safety and welfare of the operations staff and any visitor to our facility. Additionally, the potential by-product of the ash after enhancement of the operation, may present a marketable commodity whereas current disposal of same is an expense to the operation.

Regulatory Compliance – The genesis of this project was prompted by NJDEP regulations calling for better containment of the ash. Therefore, the primary outcome of this enhancement is compliance to new regulations. By March, 2015, a strategic plan to achieve compliance must be submitted to the NJDEP. After approval of the plan, implementation to design, bid, build and construct the necessary facilities must be completed by March, 2016. Therefore, this project is of utmost importance this year and is most notably a major outcome of the NBP process.

Environmental Performance – By complying with new EPA standards which were created to ensure the safety of humans in general, this project achieves another outcome of the NBP process, that being Environmental Performance. By eliminating or significantly reducing fugitive ash emissions, the environment is protected for future generations.

Better Relations with Interested Parties – The fourth outcome accomplished by this project serves to improve relations with interested parties. When achieving compliance with a regulatory mandate, a corollary achievement is the relationship forged with regulators. Regulatory agencies are more apt to have greater tolerances for delays outside of a permittee control provided that the permittee has acted diligently in its efforts to meet standards that were created to protect the public which is the greater “interested party.”

Progress to date - Throughout the year, two entities were used in gathering options for a rough design required for future compliance with the Sewer Sludge Incinerator (SSI) Rule. The Title V consultant,



Chavond-Barry, and incinerator service company, IFCO, helped to provide cost estimates and access to equipment suppliers. At the end of the process, a conceptual design was chosen based upon the following:

- a. The Atlantic County Utilities Authority (ACUA) is co-currently seeking an energy project that can demonstrate full disposal of municipal solid waste and biosolids. It is envisioned that a full scale process would be approximately 10-years from fruition; hence the life cycle costs of any investments in the incinerators should be based upon the same length of time.
- b. Any consolidation of process equipment between the two incinerators ACUA operates could provide other benefits and decreased costs.
- c. The design should address compliance, as well as building cleanliness/aesthetics.

The Wastewater VP proposed the rough design and \$1.5-million estimate to the ACUA President and Executive Vice President. Upon their approval, it was decided that a Letter of Intent (LOI) would be prepared by our engineering group and submitted for a New Jersey Environmental Infrastructure Trust Loan.

To date, the BMP Team has met the required target dates under each objective. The final target date, which involves the submittal of a plan to the EPA, remains as March, 2015. The required information is available and this formal plan can be assembled and submitted on time, ultimately fulfilling the goal.

## **2. Evaluate the possibility of by-passing the TAS operation and conveying solids directly to the dewatering centrifuges.**

### **Objectives:**

By December 1, 2014, WW staff to prepare a report that involves research of technological advances associated with equipment/machinery and prepare for presentation to engineering to discuss benefits, obstacles and overall perceived cost savings in manpower, repairs, chemicals, structural repairs that can be averted as well as potential issues that will arise if the goal becomes a reality.

By December 15, 2014, submit Report to Engineering

By February 1, 2015, meet with Engineering to determine feasibility of project that will become a major capital expense and set schedule to pursue for the October 2015 NJ Environmental Trust Program schedule for funding.

By October 1, 2015, submit a NJEIT Application for consideration for capital funding.

This goal achieves the following Key Outcomes as promoted by the NBP program:

Quality Management Practices – Not unlike most facilities, the ACUA plant was designed and constructed over 35 years ago. In addition to an aging facility, the industry as a whole as it relates to trained staff to assume the roles of those headed for retirement poses another challenge. With an outcome of quality management practices, this goal will fulfill this aspect since, if successful we will eliminate the need for replacing expensive machinery that has reached its useful life which simultaneously decrease energy, maintenance and chemical costs. Lastly, the success of the endeavor

will allow our operation to retrain personnel and refocus staff to the goals to be created for the operation.

Environmental Performance – This project will fulfill an outcome of environmental performance in that we will reduce energy consumption that being natural gas, its alternative diesel fuel and lastly electricity. By eliminating the energy needs, the environment is protected for future generations.

Progress to date - The objectives established for 2014 consisted of the research of applicable technologies and subsequent reporting to ACUA's Engineering group. During the year, BMP Team members reviewed the existing infrastructure along with any constraints in the major conveying areas and sub-systems. BMP team members approached ACUA Engineers with a conceptual plan to test the bypass process. Although the engineers expressed that the hydraulics had already been deemed as insurmountable at an earlier point in time, a decision was made to re-visit the issue. The thought was that new approaches or technologies may overcome the obstacles. An additional meeting was scheduled in August, where representatives of maintenance and operations could respond to the concept of a bypass and highlight any concerns. Shortly thereafter, the expertise of our technical spokesman for Alfa Laval shared his centrifuge knowledge as it relates to our bypass project. At this point in time, the 2014 objectives have been met, allowing for progress towards 2015 objectives. These intermediate steps between the annual objectives include a hydraulic test planned for this Fall, followed by a full operational test. If successful, the project would move to the February, 2015 objective for a full development involving our engineers.

**3. Reduce Biosolids Incinerator auxiliary fuel usage to less than base year 2010**

This is a revised goal, with a clearer sight towards being attainable. The choice of 2010 as a base year was clearly a reasonable decision since the high performance was achieved consistently for a span of about 24-months. The previous goal of a 30% reduction was not based upon SMART criteria. Reaching the new target would result in a 12% reduction in fuel consumption, compared to 2013. The history of measurable data (displayed below) dates back to the year 2008, when new centrifuges were fully operational.

2008	Combined				Natural Gas Cost	MMBTU	Natural Gas Cost / Wet Ton	MMBTU/ Wet Ton	Natural Gas Cost / Dry Ton	MMBTU/ Dry Ton
	WET TONS	% T.S.	DRY TONS	DRY METRIC TONS						
January	5466.4	25.1	1372.7	1245.1	\$125,020.48	12,713	\$22.87	2.33	\$91.07	9.26
February	5328.8	24.9	1328.0	1204.5	\$127,549.60	12,971	\$23.94	2.43	\$96.05	9.77
March	5632.0	25.8	1450.3	1315.4	\$147,872.67	15,125	\$26.26	2.69	\$101.96	10.43
April	3350.0	26.3	882.4	800.4	\$111,355.60	11,537	\$33.24	3.44	\$126.19	13.07
May	5658.7	25.5	1440.5	1306.6	\$116,697.07	12,103	\$20.62	2.14	\$81.01	8.40
June	5630.8	25.7	1449.1	1314.3	\$163,324.93	12,296	\$29.01	2.18	\$112.71	8.49
July	5785.1	26.1	1509.3	1369.0	\$178,987.98	12,526	\$30.94	2.17	\$118.59	8.30
August	5647.3	26.8	1513.4	1372.6	\$154,865.58	11,735	\$27.42	2.08	\$102.33	7.75
September	3985.1	26.5	1057.4	959.1	\$147,915.89	11,412	\$37.12	2.86	\$139.89	10.79
October	4835.8	25.1	1212.4	1099.7	\$161,821.77	13,857	\$33.46	2.87	\$133.47	11.43
November	4145.7	21.0	872.5	791.4	\$148,293.53	12,699	\$35.77	3.06	\$169.96	14.55
December	5083.6	24.5	1244.2	1128.5	\$149,615.13	12,812	\$29.43	2.52	\$120.25	10.30
	60549.3	25.3	15332.3	13906.4	1,733,320.2	151,784.3	\$28.63	2.51	\$113.05	9.90

	Combined				Natural Gas Cost	MMBTU	Natural Gas Cost / Wet Ton	MMBTU/ Wet Ton	Natural Gas Cost / Dry Ton	MMBTU/ Dry Ton
	WET TONS	% T.S.	DRY TONS	DRY METRIC TONS						
2009										
January	4287.4	22.6	969.2	879.1	\$142,916.11	11,611	\$33.33	2.71	\$147.45	11.98
February	4060.7	24.8	1006.7	913.1	\$143,600.08	10,401	\$35.36	2.56	\$142.64	10.33
March	5056.8	25.0	1266.6	1148.8	\$140,300.34	12,820	\$27.74	2.54	\$110.77	10.12
April	5288.6	24.6	1300.5	1179.6	\$145,531.87	14,017	\$27.52	2.65	\$111.90	10.78
May	4998.6	25.5	1274.0	1155.6	\$141,668.29	13,437	\$28.34	2.69	\$111.20	10.55
June	4576.5	26.2	1199.7	1088.1	\$122,967.70	11,857	\$26.87	2.59	\$102.50	9.88
July	5823.2	25.0	1456.1	1320.7	\$136,741.44	13,185	\$23.48	2.26	\$93.91	9.06
August	5294.6	26.7	1415.2	1283.6	\$120,762.36	11,621	\$22.81	2.19	\$85.33	8.21
September	4387.7	26.9	1178.4	1068.8	\$120,791.91	11,640	\$27.53	2.65	\$102.51	9.88
October	4886.3	28.0	1369.5	1242.1	\$132,370.15	12,386	\$27.09	2.53	\$96.66	9.04
November	5428.1	27.1	1468.7	1332.1	\$139,881.33	12,918	\$25.77	2.38	\$95.24	8.80
December	5290.0	24.9	1318.9	1196.3	\$137,485.97	12,386	\$25.99	2.34	\$104.24	9.39
	59378.6	25.6	15223.5	13807.7	1,625,017.5	148,279.3	\$27.37	2.50	\$106.74	9.74

	Combined				Natural Gas Cost	MMBTU	Natural Gas Cost / Wet Ton	MMBTU/ Wet Ton	Natural Gas Cost / Dry Ton	MMBTU/ Dry Ton
	WET TONS	% T.S.	DRY TONS	DRY METRIC TONS						
2010										
January	4553.1	25.1	1143.8	1037.4	\$123,055.30	12,652	\$27.03	2.78	\$107.58	11.06
February	4244.1	25.5	1082.0	981.3	\$113,573.49	12,176	\$26.76	2.87	\$104.97	11.25
March	4140.9	26.1	1079.2	978.8	\$132,171.75	13,036	\$31.92	3.15	\$122.47	12.08
April	5623.8	27.1	1524.6	1382.8	\$113,938.85	12,267	\$20.26	2.18	\$74.73	8.05
May	5245.4	25.4	1329.9	1206.2	\$113,208.13	12,085	\$21.58	2.30	\$85.13	9.09
June	4247.5	27.1	1150.7	1043.7	\$73,333.72	11,241	\$17.26	2.65	\$63.73	9.77
July	4477.4	25.9	1159.1	1051.3	\$84,050.28	11,890	\$18.77	2.66	\$72.51	10.26
August	5051.4	26.1	1319.3	1196.6	\$83,170.24	11,677	\$16.46	2.31	\$63.04	8.85
September	3649.2	26.4	963.5	873.9	\$65,133.60	11,062	\$17.85	3.03	\$67.60	11.48
October	4595.0	24.9	1142.7	1036.4	\$65,555.61	12,450	\$14.27	2.71	\$57.37	10.90
November	4310.0	25.5	1098.5	996.3	\$64,208.68	11,712	\$14.90	2.72	\$58.45	10.66
December	4131.8	25.7	1062.5	963.7	\$72,328.75	11,362	\$17.51	2.75	\$68.07	10.69
	54269.6	25.9	14055.8	12748.6	1,103,728.4	143,611.4	\$20.34	2.65	\$78.52	10.22

	Combined				Natural Gas Cost	MMBTU	Natural Gas Cost / Wet Ton	MMBTU/ Wet Ton	Natural Gas Cost / Dry Ton	MMBTU/ Dry Ton
	WET TONS	% T.S.	DRY TONS	DRY METRIC TONS						
2011										
January	4321.1	25.8	1112.7	1009.2	\$89,432.99	12,303	\$20.70	2.85	\$80.37	11.06
February	4583.5	24.2	1108.3	1005.2	\$88,501.96	13,192	\$19.31	2.88	\$79.85	11.90
March	3630.4	25.3	918.4	833.0	\$77,225.79	12,482	\$21.27	3.44	\$84.09	13.59
April	4803.6	24.2	1161.9	1053.8	\$87,885.83	13,454	\$18.30	2.80	\$75.64	11.58
May	4973.9	24.8	1234.0	1119.2	\$89,494.09	13,588	\$17.99	2.73	\$72.52	11.01
June	4579.2	25.6	1171.1	1062.2	\$83,519.61	12,773	\$18.24	2.79	\$71.32	10.91
July	4785.0	27.0	1293.3	1173.0	\$79,143.31	12,858	\$16.54	2.69	\$61.19	9.94
August	4967.6	26.7	1327.5	1204.0	\$75,171.82	12,359	\$15.13	2.49	\$56.63	9.31
September	3396.5	27.3	926.7	840.5	\$60,190.19	10,694	\$17.72	3.15	\$64.95	11.54
October	4609.2	25.6	1180.0	1070.3	\$98,831.40	13,197	\$21.44	2.86	\$83.76	11.18
November	4138.2	25.4	1049.3	951.7	\$93,000.44	13,047	\$22.47	3.15	\$88.63	12.43
December	4808.6	23.6	1134.7	1029.2	\$98,429.66	14,050	\$20.47	2.92	\$86.75	12.38
	53596.8	25.4	13617.9	12351.4	1,020,827.1	153,996.1	\$19.05	2.87	\$74.96	11.31

Combined									
2012	WET TONS	% T.S.	DRY TONS	Natural Gas Cost	MMBTU	Natural Gas Cost / Wet Ton	MMBTU/ Wet Ton	Natural Gas Cost / Dry Ton	MMBTU/ Dry Ton
January	5433.9	23.9	1300.6	\$89,941.86	14,268	\$16.55	2.63	\$69.15	10.97
February	4941.6	23.6	1167.7	\$82,464.70	12,945	\$16.69	2.62	\$70.62	11.09
March	3598.3	25.6	919.8	\$73,978.93	10,806	\$20.56	3.00	\$80.43	11.75
April	4800.5	24.9	1196.0	\$76,867.73	13,140	\$16.01	2.74	\$64.27	10.99
May	5643.0	25.4	1431.5	\$86,162.18	13,752	\$15.27	2.44	\$60.19	9.61
June	5032.0	26.0	1309.3	\$81,664.92	12,943	\$16.23	2.57	\$62.37	9.89
July	5222.0	25.6	1337.0	\$85,200.11	13,579	\$16.32	2.60	\$63.72	10.16
August	5536.2	26.3	1456.3	\$84,072.08	13,376	\$15.19	2.42	\$57.73	9.18
September	3431.7	27.5	944.5	\$76,462.34	12,012	\$22.28	3.50	\$80.96	12.72
October	4445.9	25.8	1148.4	\$84,721.37	13,084	\$19.06	2.94	\$73.77	11.39
November	3914.3	25.9	1015.5	\$94,039.52	14,721	\$24.02	3.76	\$92.60	14.50
December	5084.2	25.9	1314.5	\$102,154.24	16,130	\$20.09	3.17	\$77.71	12.27
	57083.6	25.5	14541.1	1,017,730.0	160,756.1	\$17.83	2.82	\$69.99	11.06

Combined									
2013	WET TONS	% T.S.	DRY TONS	Natural Gas Cost	MMBTU	Natural Gas Cost / Wet Ton	MMBTU/ Wet Ton	Natural Gas Cost / Dry Ton	MMBTU/ Dry Ton
January	5178.5	23.4	1214.0	\$99,708.70	16,476	\$19.25	3.18	\$82.13	13.57
February	4876.2	23.7	1153.8	\$87,321.78	14,387	\$17.91	2.95	\$75.68	12.47
March	4171.3	24.1	1003.9	\$81,101.38	13,005	\$19.44	3.12	\$80.79	12.96
April	5124.6	24.5	1254.1	\$87,419.48	13,583	\$17.06	2.65	\$69.71	10.83
May	4893.0	23.5	1151.7	\$92,316.01	14,074	\$18.87	2.88	\$80.16	12.22
June	5153.8	24.5	1260.8	\$87,970.96	13,338	\$17.07	2.59	\$69.77	10.58
July	5594.5	25.1	1404.9	\$91,112.41	14,363	\$16.29	2.57	\$64.85	10.22
August	5153.7	25.1	1294.7	\$78,835.61	12,301	\$15.30	2.39	\$60.89	9.50
September	3771.7	25.8	972.5	\$72,062.26	10,982	\$19.11	2.91	\$74.10	11.29
October	4720.2	24.9	1173.9	\$81,069.24	12,211	\$17.17	2.59	\$69.06	10.40
November	4237.5	24.7	1048.7	\$90,041.18	13,744	\$21.25	3.24	\$85.86	13.11
December	4881.8	24.2	1181.6	\$97,575.76	14,600	\$19.99	2.99	\$82.58	12.36
	57756.7	24.5	14114.6	1,046,534.8	163,064.0	\$18.12	2.82	\$74.15	11.55

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2014	Combined								
	WET TONS	% T.S.	DRY TONS	Natural Gas Cost	MMBTU	Natural Gas Cost / Wet Ton	MMBTU/ Wet Ton	Natural Gas Cost / Dry Ton	MMBTU/ Dry Ton
January	4239.6	24.8	1050.4	\$67,924.40	13,643	\$16.02	3.22	\$64.67	12.99
February	4804.8	24.2	1161.0	\$89,337.97	14,388	\$18.59	2.99	\$76.95	12.39
March	4083.5	24.2	989.2	\$65,453.54	11,992	\$16.03	2.94	\$66.17	12.12
April	5482.5	23.6	1294.9	\$73,862.49	14,292	\$13.47	2.61	\$57.04	11.04
May	5467.1	24.4	1333.7	\$75,390.54	13,977	\$13.79	2.56	\$56.53	10.48
June	4630.4	25.0	1159.3	\$72,007.78	13,833	\$15.55	2.99	\$62.11	11.93
July	4538.4	25.6	1164.0	\$62,333.88	12,539	\$13.73	2.76	\$53.55	10.77
August	4788.1	25.8	1234.1	\$93,056.26	13,211	\$19.44	2.76	\$75.40	10.70
September									
October									
November									
December									
	38034.2	24.7	9386.6	599,366.9	107,875.0	\$15.76	2.84	\$63.85	11.49

a. The objective for ACUA sludge cake quality has been reset to match the year 2010 average of 28% total solids. Seasonal targets for total solids will be: Winter-27%, Spring & Fall-28%, Summer-29%. Activities to date include:

1. Conducted interviews with operational personnel in summer 2014, to discuss and provide feedback on how to improve cake quality. The topics included polymer dosage, gravity thickener operations and the operation of activated sludge thickening.
2. Polymer representative on-site August 2014, to conduct jar testing and make observations.
3. Polymer concentration will be adjusted as per recommendation.
4. Increased mixing time will be instituted as per recommendation.
5. Trial of a new product has been recommended for the Fall.

A follow-up session with the operators will be scheduled by year's end. During these sessions, the results of these activities will be discussed and operational strategies will be developed in working towards the seasonal goals.

b. Improve Customer sludge quality to greater than 16% Total Solids.

1. Modified language in outside bio-solids customer's contract includes a 16% total solids minimum, along with the right to reject biosolids not meeting this specification.
2. Contract prices have been established for biosolids not meeting the new specification. A large penalty has been properly incorporated for the excess incinerator fuel requirement and other tangibles. Although it is preferred to reject these materials, there is recognition that we focus on chronic failure to meet specifications and work with customers as intermediate issues arise.

The customer with the most chronic failure rate appears to be responding to new contract language, as their frequency of failure has decreased from 25% to less than 10%. These results are for the first few months of the new contract period in 2014. If this is maintained, fuels savings would equate to less than 1% reduction or approximately \$2,000 per year. As other contracts are renewed, these small savings could become more significant.

c. Improve biosolids incinerator controls.

1. Venturi and Scrubber Impingement Trays replaced during March 2014 clean-out.
2. Replaced actuators and positioners on ambient air ports during March 2014 clean-out.
3. Modified Hot Air Return air dampers in June 2014.
4. Industrial Furnace to inspect, calibrate and evaluate incinerator emissions controllers. This task is due September 2014.
5. Industrial Furnace to replace incinerator burner's electronics starting March 2015.

This goal achieves the following Key Outcomes as promoted by the NBP program:

Quality Management Practices – This goal will fulfill this aspect due to the opportunity in reducing energy, along with potential reduction in maintenance.

Environmental Performance – This goal will fulfill an outcome of environmental performance in that we will reduce natural gas consumption. By reducing natural gas, air emissions are minimized.

### **III. Summaries of actions that have been taken on a voluntary basis**

From the last Biosolids Management Program Performance Report conducted in 2013, there were 11 opportunities for improvement conducted. The opportunities included:

- Removing of the “Biosolids Management Program Performance Reports” template in Element 15.
- Defining the roles and responsibilities for the Project Analyst position in Element 7.
- The developing of proficiency testing for operations staff.
- Updating of language changes to Element 12, to ensure the manual is specific to the procedures.
- Updating the specific dates for providing training as a part of Element 8 on an annual basis.
- The inclusion of the Assistant Director of Electrical & Mechanical Services, Assistant Director of Wastewater Operations, Mechanical Maintenance Manager, Electrical and Instrumentation Manager, Environmental Compliance Inspector, Plant Operations Apprentice, and the Digital Media Specialist to Element 7.
- The monitor and review by the BMP Implementation Team to evaluate the responsibilities held by the Vice President, Wastewater and the Director of Wastewater Operations when the new Vice President, Wastewater was announced.
- The providing of updates on the NBP program on the intranet shared site for all ACUA employees by the Director of Wastewater Operations in Element 9.
- Enhanced BMP training efforts by inclusion of Solid Waste drivers and by placing emphasis on distinguishing a work order from a corrective action.

### **IV. A summary of audits**

#### **Internal audits**

Internal audits of the ACUA's Biosolids Manual provide important feedback that supports continual improvement. Internal audits are intended to enable organizations to periodically identify and address weaknesses in the ACUA's Biosolids Management Program (BMP). The ACUA's internal audit was

conducted on August 22, 2013 to meet the guidelines of holding the audit annually by August documented in the ACUA's Biosolids Manual. Because the ACUA's auditor had to conduct the First Interim Audit in July of 2014, the 2014 internal audit will be held on November 18<sup>th</sup> and 19<sup>th</sup> in 2014 instead of August. A corrective action is in, to document the date change.

### **Independent third party audits (as applicable)**

The NBP has developed an independent, third party verification component of its program for biosolids. This component supports the goal of environmentally sound and publicly accepted biosolids management practices. The objectives of the third party verification audit are the following:

- Verify that the ACUA's Biosolids Program meets the expectations and requirements established by the NBP.
- Verify that the ACUA's Biosolids Program for biosolids activities is being implemented in practice, as well as paper.
- Assure environmentally sound performance of biosolids management practices.
- Increase public trust and confidence in biosolids management practices.

In 2013, a third party Onsite Readiness Review (ORR) occurred following the ACUA's first internal audit of the Biosolids Manual in July of 2012. After the ORR occurred, the ACUA's Implementation Team used the review to make the appropriate updates to meet the National Biosolids Partnership (NBP) program's objectives. In May of 2013, the first verification audit took place. The ACUA's BMP Implementation Team put all the requirements noted by the auditor through the ACUA's corrective action form, and after completing all the corrective actions from the first verification audit, the ACUA was awarded Gold Level Recognition in the NBP program. In July of 2014, the auditor returned to conduct the First Interim Audit. Again the ACUA's BMP Team put all the requirements noted by the auditor, through the ACUA's corrective action form and has made the appropriate updates or set plans to address all the requirements.

### **V. Contractor activities**

The ACUA has identified four contractors associated with having biosolids activities with the ACUA's Biosolids Program. The activities include transportation of biosolids ash to the ACUA's landfill, consulting for engineering services associated with the ACUA's incinerator, and the contracting of services for polymer associated with the ACUA's Biosolids Program. The four contractors include:

- ACUA: Solid Waste Division – For providing transportation services for ash delivery;
- Polydyne, Inc. – For providing polymer goods and services to the ACUA;
- Industrial Furnace Company Inc. – For providing engineering consulting services for the ACUA's incinerator; and
- Chavond-Barry Engineering Corp. – For providing engineering consulting services for the ACUA's incinerator

### **VI. A summary of corrective actions**

The ACUA utilizes the Corrective Action/Improvement Form to track all corrective actions. To date, the ACUA's corrective actions have involved the employee's suggestions for the ACUA's Biosolids Manual, along with the internal audits, the ORR observations, opportunities for improvement, the verification

audit, and the first interim audit completed by NSF International Strategic Registration, Ltd. The ACUA's BMP Implementation Team has completed 102 Corrective Action/Improvement Forms with 11 assigned and in the resolution development stage.

**Other BMP Activities**

There are no other BMP Activities to report, since the 2013 Biosolids Management Program Performance Report.

**Continual Improvement**

There were many meaningful biosolids management activities in 2013-2014 which were conducted in the spirit of continual improvement. However, by reviewing the activities that occurred in the previous year, the ACUA will be able to continually improve its BMP for the Biosolids Program in subsequent years. The ACUA will continue to host the Earth Day Festival, which provides an opportunity to showcase the ACUA's biosolids and management programs. Past events allowed the ACUA to continually improve its relations with interested parties. The 2014, Goals & Objectives meet the specific, measurable, achievable, relevant, and time-bound (SMART) criteria and give the ACUA the opportunity to continually improve its management program.