

# ALEXANDRIA SANITATION AUTHORITY

## Biosolids Management Program Performance Report For the period

January 1, 2009 to December 31, 2009

ASA is committed to environmental stewardship and sustainability. We pledge to consistently deliver a high level of public service to our customers and the community by optimizing both the environmental and business performance of our biosolids management program. We commit to following the principles as set forth in the National Biosolids Partnership (NBP) Code of Good Practice and the VBC Code of Good Practices.



This is the third edition of the Alexandria Sanitation Authority (ASA) annual Biosolids Program Performance Report. This report details the biosolids activities over the referenced year and outlines plans for the coming year. The report is also required for a biosolids Environmental Management System (EMS). An EMS is a modern management approach to develop, implement, and monitor environmentally sustainable practices. An EMS helps a utility be more efficient, open, and protective of the environment beyond regulatory compliance.

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## **Biosolids Production and Analytical Data for 2009**

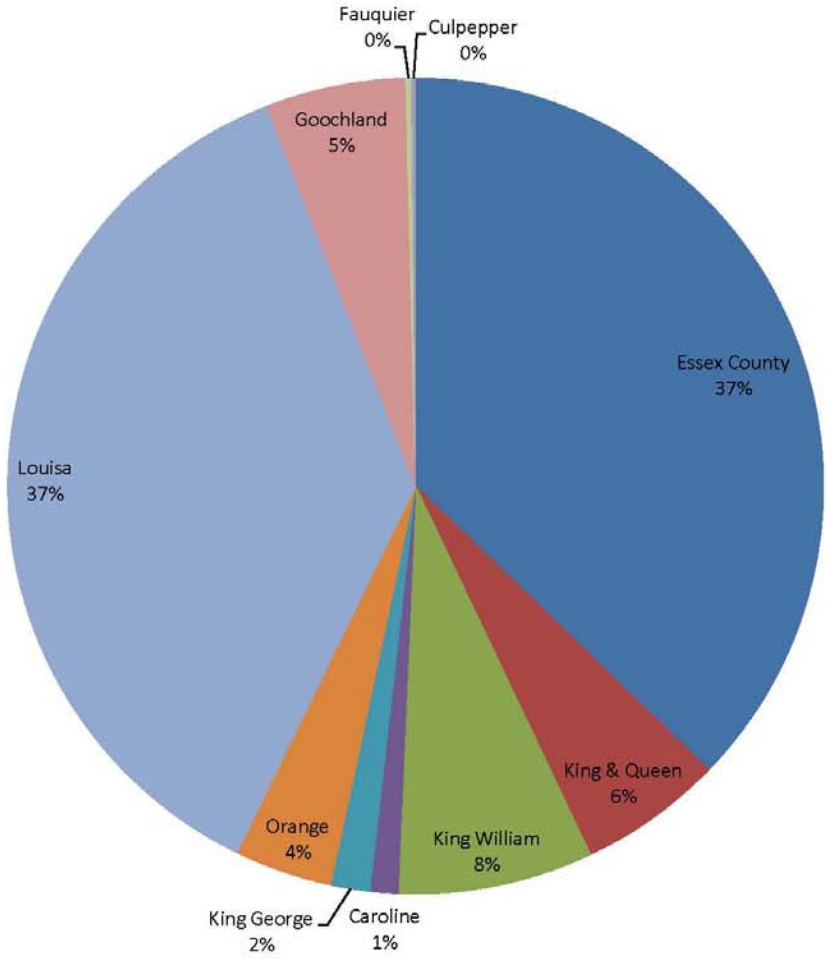
Biosolids were generated and land applied throughout 2009. The wet tons of biosolids produced and beneficially reused are shown in the following table.

<b>Production Month</b>	<b>Wet Tons Produced</b>
<b>January</b>	<b>2210.26</b>
<b>February</b>	<b>1935.64</b>
<b>March</b>	<b>1913.41</b>
<b>April</b>	<b>1957.40</b>
<b>May</b>	<b>1953.10</b>
<b>June</b>	<b>2237.84</b>
<b>July</b>	<b>2047.60</b>
<b>August</b>	<b>1883.35</b>
<b>September</b>	<b>1574.25</b>
<b>October</b>	<b>2107.73</b>
<b>November</b>	<b>2009.44</b>
<b>December</b>	<b>2235.47</b>

The distribution of biosolids by Virginia County is shown on the following chart. Essex and Louisa Counties, together accounted for approximately 75% of the beneficially used biosolids, which is consistent with previous land application rates.



### Biosolids Land Application by Virginia County - 2009



The data in the following table summarize the quality of ASA's biosolids during 2009. Readers should note that the pasteurization process that reduces pathogens to Class A levels began operations in the fall of 2005. *Salmonella* is listed in the EPA's guidance document (40 CFR, Part 503) as a bacterial pathogen that can be monitored for Class A compliance. ASA evaluates dewatered biosolids for *Salmonella* each month. In addition, ASA periodically analyze biosolids samples for viral pathogens. While it is not necessary to test for both bacterial and viral pathogens, ASA chose to confirm that the pasteurization process is effective against both. The specific viral pathogens screened were Enteric Viruses and viable Helminth Ova. Also indicated on the data table are levels of heavy metals. All were well below the regulatory limits for concentration (the first nine rows). The next three rows provide Class A results for pathogens and the final two rows focus on the stabilization process. Both Volatile Solids Reduction and Hydraulic Retention time parameters far exceed the minimum compliance requirements for Vector Attraction Reduction.



Biosolids Analytical Data for 2009														
Parameter		Regulatory Limit	Jan 09	Feb 09	Mar 09	Apr 09	May 09	June 09	July 09	Aug 09	Sept 09	Oct 09	Nov 09	Dec 09
Arsenic (mg/Kg) Dry	Mo. Avg.	41	6.3	6.7	5.2	5.3	7.6	7.5	6.8	6.2	8.1	8.2	10.9	9.6
Cadmium (mg/Kg) Dry	Mo. Avg.	39	1	2	2	1	2	<1	<1	<1	1	2	2	2
Molybdenum (mg/Kg) Dry	Mo. Avg.	No Limit	9	9	8	7	8	8	8	10	10	8	10	8
Copper (mg/Kg) Dry	Mo. Avg.	1500	297	295	299	295	317	350	358	428	401	418	368	319
Lead (mg/Kg) Dry	Mo. Avg.	300	37	45	41	43	44	42	35	39	35	47	37	44
Nickel (mg/Kg) Dry	Mo. Avg.	420	19	18	16	19	22	19	17	19	17	19	18	19
Mercury (mg/Kg) Dry	Mo. Avg.	17	0.9	1.4	1.1	1.3	1.5	1.1	1.2	2.5	1.5	1.2	1.2	0.9
Selenium (mg/Kg) Dry	Mo. Avg.	100	5.7	3.5	1.6	7.9	4.2	6.7	7.6	10.2	6.6	4.7	3.8	3.0
Zinc (mg/Kg) Dry	Mo. Avg.	2800	794	754	727	770	751	841	874	1130	1000	1090	951	813
Salmonella sp (MPN/g Dry)	Mo. Avg.	3 MPN/4g Dry	<3	<3	<3	<3	<3	<3	<3	<1	<3	<1	<3	<1
Enteric Virus (<1PFU/4g Dry)	NA		--	<1	--	--	--	--	<1	--	--	--	<1	--
Viable Helminth Ova (<1 ova/4g Dry)	NA		--	<1	--	--	--	--	<1	--	--	--	<1	--
Volatile Solids Reduction (%)	Mo. Avg.	Min 38%	55	56	54	52	51	53	56	52	56	55	52	48
Hydraulic Retention Time (Days)	Mo. Avg.	Min 15 Days	33	31	33	33	32	33	32	33	38	41	39	38

## 2009 Audit Results



### Internal Audit

An internal audit was conducted in 2009 as required by the EMS program. This is the second internal audit conducted. EMS documents including all 17 Elements were reviewed and selected staff was interviewed. Work practices were observed in the field and compared to operational guidelines establishing how each unit process should be operated.

The Biosolids EMS manual contains all of the required elements and each appeared to meet the National Biosolids Partnership's minimum conformance requirements. The EMS internal audit team was selected in October 2008. Working with the EMS team, and following the procedure in Element 16, audit checklists from the 2008 audit were reviewed and modified as needed for each of the program elements. The checklists were completed by mid-December 2008. The audit team met on December 14, 2008 to begin the preliminary steps for planning the audit and held a kick-off meeting January 8, 2009. Additional meetings were held to update the audit team on the audit progress.

The audit was conducted from January 9, 2009 through February 9, 2009. The Biosolids EMS manual contains all of the required elements and each appeared to meet the National Biosolids Partnership's minimum conformance requirements.

The audit findings resulted in four Positive Observations, three Major Non-Conformances, twelve Minor Non-Conformances and three Opportunities for Improvement. Overall the EMS program continues to improve with fewer non-conformances noted during this audit than the previous internal audit. Staff work practices are consistent with documented operational controls and staff is familiar with the program, roles and responsibilities, and the location of documents needed to perform their job. This has resulted in continuous improvement in biosolids quality, improved the effectiveness of operations, helped meet regulatory requirements, and addressed other issues of concern to biosolids stakeholders.

## **Interim Audit**

The NSF- International Strategic Registrations, Ltd. (NSF-ISR) conducted a third party interim audit of the Alexandria Sanitation Authority's EMS for Biosolids from April 14, 2009 through April 16, 2009. This is a required audit for facilities to remain certified in the National Biosolids Partnership program.

The interim audit included review of the latest versions of the ASA element procedures and employed the most recent version of the NBP Third Party Verification Auditor Guidance dated August 2007. The interim audit found 5 positive observations, 1 major non-conformance (which included several carryover minor non-conformances), 7 minor non-conformances and 15 opportunities for improvement. The corrective actions associated with a considerable number of minor non-conformances identified during the verification audit were observed to have not been implemented, leading to a systemic major nonconformance associated with the corrective action program.

The results of the third party interim audit show the ASA has a fundamentally strong Environmental Management System. The NSF lead auditor reviewed the implantation of the corrective action plan for the major nonconformance and associated minor non-conformances on May 28, 2009. Additionally the corrective action plans for the new minor non-conformances were reviewed and approve at the same time. Therefore, it was the recommendation of the audit team that ASA's Biosolids Environmental Management System (EMS), Alexandria, Virginia retain its "verification" status.

## **Public Input, Inquiries and Public Outreach Activities**

Numerous outreach activities were performed in 2009 including a substantial number of plant tours, Earth Day participation, and, conference attendances. Fresh efforts are being developed in order to obtain public input. These efforts include enhancements to ASA's website and retaining the services of a communications specialist to help manage outreach activities. A summary of inquiries into ASA's biosolids program in 2009 is included in this report.

### **Major Outreach Activities in 2009**

Plant Tours

Earth Day Display

Earth Force Display

Involvement in Residuals and Biosolids Management Conference

**Member of the DEQ Expert Panel**

**Virginia Biosolids Council Participation**

**Mid-Atlantic Biosolids Association Participation**

**National Biosolids Partnership Appeals Board Member**

**A summary of public input or comment in 2009 is presented in the following table.**

### Public Input Log

Name	Organization	Location	Date	Notes	Response
Shaban I. Kotob	Arcotech	Chantilly, VA	1/31/09	Wants to partner with ASA on biosolids research projects.	Forwarded request ASA Energy Team.
Susan McGlothan	USEPA	D.C.	2/1/09	Wants to tour solids processing facilities.	Provided a plant tour of the biosolids facilities.
John Janeau	Farmer	Northern VA	2/23/09	Wanted to obtain pelletized biosolids.	Provided info on the Leesburg WWTP.
Teresa Scott	DCWASA	D.C.	2/23/09	Wanted information on current biosolids reuse contract.	Provided information daily hauling amounts and per ton rate.
John Willis	Brown and Caldwell	Northern Va	5/14/09	Wanted to stop by the plant to view solids processing.	Was unable to accommodate this request.

## **Non-Conformance and Non-Compliance Summary**

There were a number of Corrective Action Notices for non-conformances generated during 2009. Most were related to audit findings. The others were either process abnormalities or equipment failures. None were caused by or resulted in a regulatory violation and none presented a threat to the environment. Those related to audit findings required the development of a Corrective Action Work Plan to systematically execute the appropriate corrective action. All Corrective Action Work Plans for nonconformance that were generated in 2009 have been addressed. A summary of Corrective Action Notices generated in 2009 is presented in the following table.

<b>Critical Control Point</b>	<b>Issue Date</b>	<b>Closure Date</b>	<b>Issue Summary</b>	<b>Work Plan</b>	<b>Issue Status</b>	<b>Notes</b>
2009 Internal Audit	2/16/09	5/20/09	15.4 - The procedure for the biosolids management report is not being followed	Yes	Closed	Biosolids Management Performance Report completed.
2009 Internal Audit	2/16/09	4/20/09	17.1 – There was no management review in 2008.	Yes	Closed	Management Review conducted April 20, 2009.
2009 Internal Audit	2/16/09	5/30/09	1.7 - The EMS Manual describes biosolids management activities assigned to and performed by contractors; however Document 3.2 is not accurate. MES no longer conducts inspections. There is no description documenting current inspections and reporting.	Yes	Closed	Revised Document 3.2
2009 Internal Audit	2/16/09	7/22/09	5.1 - The procedure for developing goals and objectives was reviewed, noting that the procedure requires alignment with ASA's strategic plan. In general, the objectives are moving forward, however the status is not formally documented per the element, using other appropriate methods to monitor the results.	Yes	Closed	Revised Element 5.
2009 Internal Audit	2/16/09	4/20/09	5.2 - Comment made during verification audit still valid, "However, there is no action plan identifying the specific tasks or improvement activities to achieve program goals and objectives. Additionally, there are no schedules, milestones, resources, and responsibilities for achieving the program goals and objectives identified."	Yes	Closed	Revised and approved plan for tracking and communicating schedules, milestones and objectives.
2009 Internal Audit	2/16/09	7/10/09	5.6 - According to available documents, no actions plans were developed for the goals and objectives 1.1 and 1.2. Both of these objectives are overdue.	Yes	Closed	Status update process and objectives revised.

2009 Internal Audit	2/16/09	6/25/09	8.3 - Awareness training occurred and documented in 2006. Biosolids training for Clean Fields staff occurred in December 2008 and documented. The Biosolids records did not contain the contractors training records. The element requires annual training of all staff.	Yes	Closed	Annual training conducted with records managed by the Training Coordinator.
2009 Internal Audit	2/16/09	6/25/09	10.2 - The Critical Control Points for management activities are covered throughout the biosolids value chain; however Document 3.2 should be updated. Most Critical Control Points reference "Operational Guideline" as the Monitoring Parameter/SOP. The specific Operational Guideline should be referenced in the document. In addition, Document 3.2 identifies MES Inspections for many of the Operation Controls identified in the transport and management of biosolids and resulting end use; however this company no longer provides the described services.	Yes	Closed	Documents corrected and revised.
2009 Internal Audit	2/16/09	5/30/09	11.6 - The emergency preparedness and response plans are in the Synagro manual. Asked Joel where the manual is located and he was not sure. Was unable to locate the manual or procedures.	Yes	Closed	Manual made available.
2009 Internal Audit	2/16/09	6/26/09	12.2 - No records were found in EMS for: -equipment calibration, monitoring, and measurement -laboratory testing and inspection -emergency response incident reports -public participation meetings Per 12.2, Operator 10 does contain operating dataviews, but no logs of activities.	Yes	Closed	Revised element #12 and any supporting documents have been documented and the new version is located in our biosolids EMS manual.
2009 Internal Audit	2/16/09	6/26/09	12.5 - The only documents found regarding activities conducted by	Yes	Closed	Revised element #12 and any supporting documents have been

			contractors were MES inspections (though not located as noted in 12.2) Synagro documentation listed (monthly reports and contract) were not available though the 'ASA Intranet'.			documented and the new version is located in our biosolids EMS manual. (Action plan used to resolve 12.2 from audit.)
2009 Internal Audit	2/16/09	6/25/09	13.1 - Document 5.2 lists the current goal and three objectives. In addition, this document lists current status. There is no evidence of progress towards any of the objectives listed in Document 5.2. Also, two of the objectives have target dates that have passed.	Yes	Closed	The performance indicators chart has been updated to include the reviewed relevancy and new indicators that monitor progress towards our Goal and Objectives.
2009 Internal Audit	2/16/09	6/25/09	13.4 - The procedure does not reference a form or template for recording monitoring and measurement results. There is a document 13.2 that lists performance indicators, but it is not clear that the listed indicators are used to measure progress towards goals and objectives.	Yes	Closed	The performance indicators chart has been updated to include the reviewed relevancy and new indicators that monitor progress towards our Goal and Objectives. (Action plan used to resolve 13.1 from audit.)
2009 Internal Audit	2/16/09	6/25/09	13.5 - The monitoring and measurement procedure states a purpose of the procedure is to ensure compliance with legal and other requirements, however there is no associated monitoring procedure.	Yes	Closed	The performance indicators chart has been updated to include the reviewed relevancy and new indicators that monitor progress towards our Goal and Objectives. (Action plan used to resolve 13.1 from audit.)
2009 Interim Audit	4/16/09	5/22/09	Requirement 14 – The non-conformance and preventive action element has not been fully implemented.	Yes	Closed	Plans were constructed to fully implement this element.
2009 Interim Audit	4/16/09	5/13/09	Requirement 1.2 – There was no objective evidence available to demonstrate that the Biosolids EMS Manual (ASA's Core Documents) has been approved "by a level of the organization's management with the authority to commit people and resources to biosolids management activities."	Yes	Closed	Created a supporting document to Element 1 that requires signature from top management that the core documents have been reviewed and approved.

2009 Interim Audit	4/16/09	6/25/09	Requirement 8.4 – The biosolids records did not contain or reference the location of the biosolids contractors training activities.	Yes	Closed	Added contractor training records and location to the Records list (Document #12.3) and reference the “Records list 12.3” in element 8.
2009 Interim Audit	4/16/09	7/24/09	Requirement 9 – Section 9.1.4 of the Communications Procedure indicates that the procedure describes regulatory agencies communication; however the procedure does not provide a description of how this is addressed.	Yes	Closed	Created a document that outline the EMS Coordinator and Green Fields director procedure to capture communications with regulatory agencies. Prepare a summary of those interviews to be used as a description.
2009 Interim Audit	4/16/09	6/26/09	Requirement 12.2 – Minor Nonconformance – The EMS does not provide links or cross references to the locations of EMS documents or records for: <ul style="list-style-type: none"> <li>- Equipment calibration, monitoring and measurement (CMMS)</li> <li>- Laboratory testing and inspection (LIMS)</li> <li>- Emergency response incident reports</li> <li>- Public participation meetings</li> <li>- Logs of activities contained in “Operator 10” data views</li> <li>- Biosolids activities of contractors</li> </ul>	Yes	Closed	Listed out all mention of records in the EMS using that list verify location and content are correct. Any record locations deemed not correct will be removed from the system. Using the verified list create a master list of records and place it in Element 12. Revised element #12 and any supporting documents necessary to correct non-conformance.
2009 Interim Audit	4/16/09	6/25/09	Requirement 13.4 – The monitoring and measurement procedure does not reference the fact that document 13.2 lists the “ASA Performance Indicators” for operational controls; additionally monitoring and measurement methods and tracking for objectives are not referenced or described in the procedure.	Yes	Closed	Incorporated review of goals and objectives work plans into the monthly EMS meeting including documenting the review in the meeting minutes. Referenced the meeting minute’s template and location of the actual minutes in Document 12.3 records list.
2009 Interim Audit	4/16/09	7/16/09	Requirement 14.5 – The completion of the “Corrective Action Plan” (CAP) form uses very general statements in the description of tasks required to correct the nonconformance. The actual tasks	Yes	Closed	Added a requirement to all corrective action plans which dictates that a root cause analysis be performed and documented. Added a requirement to all corrective action plans which

			used to identify the root cause and develop the corrective and preventive action plans are not presently captured in the CAPs.			outlines the actions that may prevent similar non-conformances in the future.
2009 Interim Audit	4/16/09	8/5/09	Requirement 15.1 – Item 2 in section 15.1.4 of Document 15.1 – EMS Element 15, version 03, 2/13/2008 indicates that comments on each land application inspection by the third party inspection consultant shall be included in the report. This is not included in the 2008 performance report. Likewise, the document requires a summary of actions taken as a result of input from the public and interested parties, which was not found in the report.	Yes	Closed	Create a template for future all “Biosolids Management Program Performance Reports” include all topics listed in element 15.1.4.2 under the header “The report shall include” and distribute prior to the July 2009 EMS monthly meeting.
2009 Interim Audit	4/16/09	9/1/2009	Requirement 17.2 – There was no objective evidence that scope for review, findings, evaluations, follow-up actions, changes to policies, plans, practices and other EMS elements resulting from the Management Review have been documented according to the requirements of Document # 17.1, which refers to Element 12 - Documentation. This was a minor finding in the verification audit and the corrective action has not yet been fully implemented. (NOTE: While SOP 4.4.6.36 – “Management Review” dated 9 April 2009, has been developed to address this deficiency a reference to this SOP is not presently contained in the Element procedure nor has the SOP been implemented.)	Yes	Closed	Reviewed NBP minimum conformance requirements, Element procedures for Documentation and Management Review, and the Plant EMS procedure for Management Review and recommend revisions that address this non-conformance.
Dewatering	5/5/09	5/8/09	Dewatering centrifuges are not reaching the target 95% capture.	No	Closed	The DSET mixer was verified to be working. May 5 The team switched super sack of polymer with a different

						Lot #. Cleaned the feed tube found some blockage of polymer feed nozzles. Corrected polymer concentration calculation was feeding less polymer than SCADA indicated.
Awareness	6/25/09	9/30/09	During the quarterly "all-hands" meeting there was an unacceptable level of awareness of the biosolids EMS program.	Yes	Closed	Developed an implementation plan and schedule to perform EMS Awareness Training for all ASA personnel.

## **Continuous Improvement Summary**

There are a number of significant improvements that were realized in 2009 related to ASA's biosolids program.

- Improved an enhanced biosolids sampling and testing program
- Increased participation in biosolids research initiatives, specifically working with Virginia Tech Crop and Soil Environmental Sciences
- Beneficially reused 100% of ASA biosolids
- Improved EMS system efficiencies by merging the biosolids EMS with the ISO 14001 EMS

The ASA Biosolids goal for its EMS was established cognizant of each of the four outcome focal points of the NBP program as identified below and designed to ensure that it meets the SMART criteria, Environmental Performance, Regulatory Compliance, Relations with Interested Parties, and Quality Biosolids Management Practices.

While it is not a requirement to attain all objectives established, it is a critical component of the system to make progress towards accomplishing the overall goals. ASA has developed one major program goal for continuous improvement under the provision of the EMS. This goal is to develop the capacity to reuse 100% of ASA biosolids in an option other than land application. The following are the objectives that are designed to achieve this goal:

- Objective 1 – Initiative a pilot project to develop a marketable biosolids product - Completed
- Objective 2 – Incorporate the new reuse option into ASA's biosolids EMS and address regulatory requirements for the new option - Ongoing
- Objective 3 – Develop partnerships with ASA customers that will determine the capacity for local reuse by the end of 2008 – Delayed due to Contractor permitting issues.
- Objective 4 – Beneficially reuse 1% of ASA biosolids in an option other than land application by 2009 - Completed

A Responsible Person has been assigned accountability for the objectives associated with this goal. A specific procedure is in place for the management of objectives. A comprehensive Action Plan has been developed to document progress to accomplish the goal. This Action Plan provides a global view on the status of activities needed to achieve EMS goals and objectives. This Action Plan is also a primary tool to communicate scheduling, resource

allocation, and upcoming activities. A substantial amount of work has been completed toward achieving the stated goal. Progress was limited due to the transfer of regulatory oversight from the Virginia Dept. of Health to the Virginia Dept. of Environmental Quality. The transfer necessitated a moratorium on the issuance of Distribution and Marketing permits. In addition, research associated with product development has not been completed. This research is needed to help determine the environmental and social benefits of the blended product. Contingency actions to address these constraints have been implemented. ASA developed a number of initiatives to improve its biosolids management program in 2009. These initiatives include the following:

- Utilizing ASA's Technician Program to develop an in-house land application inspection procedure.
- Develop and implement an improved EMS documentation and recordkeeping system
- Develop a training program for ASA personnel to effectively perform internal audits
- Expand cooperation with other agencies to improve EMS programs
- Research technologies to utilize biosolids for energy production.
- Expanding the scope of work of a public relations firm to help solicit public input on ASA's biosolids program.

The successful execution of these initiatives is expected to enhance ASA's biosolids management program and will help demonstrate continuous improvement.