



**BIOSOLIDS MANAGEMENT PROGRAM &
ENVIRONMENTAL MANAGEMENT SYSTEM
(EMS)**

***ANNUAL PERFORMANCE REPORT
2014-2015***



John Carman, Water Director

Sebastian (Buster) Fichera, Assistant Water Director

Steven L. Nutter, Biosolids EMS Manager

Magan Lersch, Biosolids EMS Coordinator

2014-2015

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PROGRAM SUMMARY

- During the past reporting year (August 1st, 2014-July 31st, 2015), the City of Fort Worth's Biosolids Program beneficially reused/recycled 53.55% (includes lime) of its Class AB biosolids and landfilled 46.45% due to concerns regarding odors.
- In some situations, the City must send biosolids material to the landfill. However, keeping biosolids out of the landfills saves an average of \$230,000 per month.
- In August 2015, a new biosolids policy was approved by both the Assistant Water Director over the Water Reclamation and Reuse Division and the Water Director.
- During the third-party audit in October 2014, 1 major nonconformance, 1 minor nonconformance and 7 opportunities for improvement were found. These can be viewed in Appendix A.
- In April 2015, an additional employee was added to the biosolids staff due to changes to Village Creek's Texas Pollutant Discharge Elimination System (TPDES) permit that now requires more oversight monitoring for biosolids activities. This employee is also responsible for developing new public outreach methods for the biosolids program.

INTRODUCTION

The biosolids program is a public/private partnership where the contractor, Renda Environmental, Inc. (REI), is responsible for processing, dewatering, transporting and performing beneficial land application of biosolids produced from the Village Creek Water Reclamation Facility. REI is under contract to provide these services until March 31, 2020.

Biosolids EMS Certification

In July 2005, the Fort Worth Biosolids Program obtained national certification from the National Biosolids Partnership (NBP) for the development and implementation of an Environmental Management System (EMS).

In July 2006, the Fort Worth Biosolids EMS Program successfully underwent internal and external audits and met requirements to maintain EMS certification and obtained the "Biosolids EMS – Tier 4 Platinum Certification" which *"represents the highest achievement in biosolids management and environmental stewardship recognized by the Water Environment Federation (WEF), National Association of Clean Water Agencies (NACWA), and the United States Environmental Protection Agency (EPA)."*

The Biosolids EMS program is audited on an annual basis to ensure proper program implementation. A comprehensive recertification audit is performed once every 5 years. The next audit the biosolids program will undergo will be a recertification audit. REI is an active partner in the biosolids EMS program and participates in the yearly audits.

Annual Performance Report

One of the requirements of the Biosolids EMS Program is to provide an EMS Annual Performance Report (APR) outlining biosolids activities and operations during the previous year. This information is then made available to all interested parties.

This APR summarizes Fort Worth's biosolids management program performance, biosolids production and reuse, goals and objectives, EMS activities, public outreach, and the commitment towards continual improvement. This report and other biosolids information on operations and activities are detailed on the City's website.

2014-2015

SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM

Annual Biosolids Report Period:	August 1 st , 2014 to July 31 st , 2015
Registration/Permit Number:	TPDES #10494-013
Transporter No.:	TCEQ--#21942 (Renda Environmental, Inc.) TXDOT--#45267C (Renda Environmental, Inc.)
Amount of biosolids beneficially reused/recycled:	13,629.39 dry tons (without lime)/year
Amount of biosolids beneficially reused/recycled:	12,364.37 dry metric tons (without lime)/year
Percentage of biosolids beneficially reused/recycled:	53.55%
Type of biosolids produced:	Class AB



Biosolids Production

The City of Fort Worth produces biosolids at the City's dewatering facility located north of the Village Creek Water Reclamation Facility (VC). During 2014-2015, 25,454.00 dry tons (without lime) of biosolids were produced. Due to concerns regarding odor issues, 11,824.61 dry tons were landfilled (46.45 % of total dry tons produced-with lime).

The biosolids that have been produced have been anaerobically digested and dewatered by belt filter press to produce a cake product that is 17% to 19% solids.

Lime is added to the biosolids after dewatering to ensure compliance with the pathogen requirements in the TPDES permit. The biosolids are then land applied by Renda Environmental, Inc.; the City's contractor.

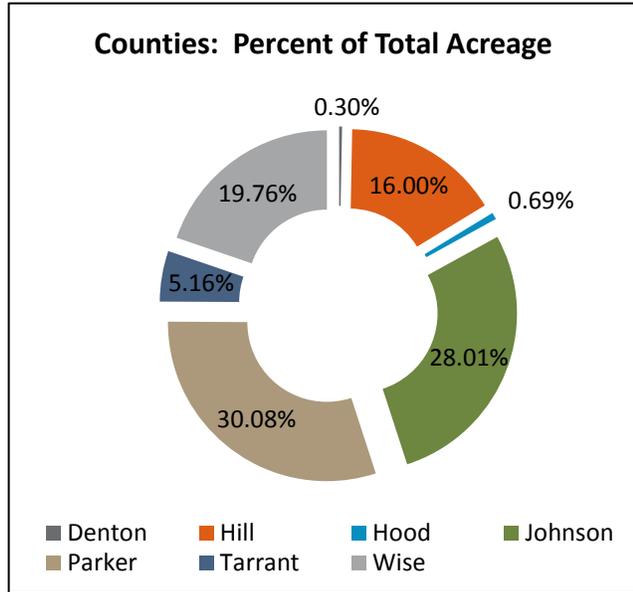
Beneficial Reuse Options and Management Practices

Biosolids produced at VC were properly processed, monitored, and agronomically land applied to thousands of acres of farm and pasture land in Hill, Johnson, Tarrant and Wise counties. The biosolids serve as an excellent soil amendment and add to the nutrient value to crops and grasses.

The following map and table show landowner participation by county in the Fort Worth Beneficial Reuse/Recycling Program.



SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)



BIOSOLIDS APPLICATION: AMOUNTS BY COUNTY

Counties	Landowners	Noticed Sites	Total Acreage	(%) of total acreage	Tons Applied (Includes lime) Aug 2014-Jul 2015
Denton	1	1	125.00	0.30%	----
Hill	9	21	6,701.00	16.00%	5,879.75
Hood	2	2	291.00	0.69%	----
Johnson	16	33	11,732.00	28.01%	6,134.75
Parker	6	6	12,599.00	30.08%	-----
Tarrant	6	6	2,162.00	5.16%	375.67
Wise	10	13	8,276.00	19.76%	2,101.48
TOTAL	50	82	41,886.00	100%	14,491.64

SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)

Contractor Performance

Biosolids operations in Fort Worth are handled by Renda Environmental, Inc. (REI).

REI is responsible for:

- Operation of the dewatering facility and further processing of the biosolids by belt-filter press dewatering;
- Transportation of biosolids material;
- Land application to beneficially reuse the biosolids produced at VC;
- Posting signage at land application sites that include contact information;
- Daily odor monitoring at land application sites and
- Performing necessary biosolids sampling for permit compliance.



REI operates and maintains the belt filter presses and all auxiliary equipment and continually monitors and tracks the amount of biosolids applied to each land application site.

City Oversight/Inspections

City personnel perform daily visits and inspections to the dewatering facility and land application sites to ensure that the contractor is following best biosolids management practices concerning biosolids dewatering, transportation and land application.

While a site is undergoing land application, City personnel will perform a site inspection detailing weather conditions, truck conditions, haul road conditions, and overall site conditions. An olfactometer is used to help quantify odors and establish an odor monitoring history at the land application sites.

When a land application site reaches completion, a final close-out visit is conducted by City personnel. This final site visit is performed to ensure that all biosolids material has been properly applied and all equipment has been removed.

From August 1, 2014 to July 31, 2015, 77 land application site visits were performed by city personnel. Site visits include odor monitoring with an olfactometer. Due to odor concerns, land application was halted for part of March and all of April, May and June of 2015. During these months, no site visits were performed. However, odor monitoring at the dewatering facility continued to occur.

Monitoring and Measurement

By City contract, REI uses an independent certified laboratory to analyze the biosolids produced at VC. Samples of biosolids are taken from the process areas and analyzed for fecal coliform, pathogens, metals, PCBs, pH, percent solids, and vector attraction reduction. Sampling frequency is established by the contract; which includes federal, state, and local regulatory reporting requirements and can be found summarized in the table on the next page.

SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)

TPDES CLASS AB BIOSOLIDS MONITORING METHODS AND FREQUENCY

	30 TAC 312.82 (a) Alternative 4
Pathogen Reduction	<ul style="list-style-type: none"> Fecal Coliform Density <1000 MPN* Enteric Virus Density <1 Plaque-forming unit per 4 gram total solids** Viable Helminth Ova Density <1 per 4 grams total solids**
	30 TAC 312.83 (b) (1-8) Alternative 6, Alternative 1
Vector Attraction Reduction	<ul style="list-style-type: none"> Alternative 6: pH of sewage sludge shall be raised to 12 or higher by alkali addition and, without the addition of more alkali, shall remain at 12 or higher for two hours and then remain at a pH of 11.5 or higher for an additional 22 hours Alternative 1: The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.

<i>Monitored Item</i>	<i>Frequency</i>
Fecal Coliform	Two (2) times per month
Pathogens	Two (2) times per month
Metals	Monthly
PCBs	Monthly
TCLP	Two (2) times per year
pH (Vector Attraction Reduction)	Operation Process-Daily; Regulatory Compliance- Weekly (when using Alternative 6)
% Solids	Daily

** Most Probable Number*

*** Dry Weight Basis*

SECTION 1: BIOSOLIDS MANAGEMENT PROGRAM (CONT.)

Biosolids samples are analyzed monthly for metals and polychlorinated biphenyls (PCBs). During 2014-2015, all metal concentrations were significantly below Table 1 ceiling concentration limits and Table 3 pollutant concentrations as required by 40 CFR 503 and 30 TAC 312, for the use or disposal of sewage sludge. The metals and PCB concentrations are shown in the following table.

In addition, the City and REI collect biosolids samples which then undergo TCLP (Toxicity Characteristic Leaching Procedure) analysis. Three TCLP samples were collected during the 2014-2015 reporting year. All samples were compliant with TCLP standards.

METAL AND PCB CONCENTRATION (REPORTED IN MG/KG DRY WEIGHT BASIS)											
Year	As	Cd	Cr	Cu	Pb	Hg	Mo	Ni	Se	Zn	PCB
2014-2015	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
NPDES Permit Limits (Table 1)	75	85	3000	4300	840	57	75	420	100	7500	n/a
NPDES Permit Limits (Table 3)	41	39	1200	1500	300	17	***	420	36	2800	n/a
August	9.20	0.00	24.20	356.00	19.50	0.21	15.00	32.60	3.70	421	0.00
September	12.90	1.00	28.20	481.00	21.50	0.39	17.60	30.30	4.40	581	0.00
October	14.20	1.00	29.70	454.00	20.80	0.38	18.60	22.00	5.40	520	0.00
November	12.50	1.40	32.10	452.00	22.30	0.29	19.70	27.30	4.70	529	0.00
December	10.90	1.30	39.90	522.00	21.60	0.34	21.40	26.40	2.40	597	0.00
January	8.70	2.10	51.10	525.00	27.40	0.39	18.80	34.80	4.00	630	0.00
February	6.20	1.20	61.20	454.00	27.60	0.25	13.30	34.20	2.30	557	0.00
March	6.00	1.20	41.90	466.00	22.80	0.33	16.70	21.90	3.90	770	0.00
April	5.10	0.00	50.60	467.00	33.90	0.32	12.90	22.90	3.90	637	0.00
May	8.80	1.30	56.50	525.00	37.80	0.48	12.30	20.30	3.90	670	0.00
June	7.90	3.20	41.40	322.00	24.10	0.26	8.00	21.50	5.20	483	0.00
July	9.10	2.30	52.90	420.00	27.50	0.27	9.50	22.20	5.60	550	0.00
Yearly Avg. Metals Conc.	9.29	1.33	42.48	453.67	25.57	0.33	15.32	26.37	4.12	579	ND
Highest Monthly Conc.	14.20	3.20	61.20	525.00	37.80	0.48	21.40	34.80	5.60	770	ND

***No limit established by federal regulations

Pathogen Requirement Achieved: Class AB
Pathogen Reduction Alternative Used: Alternative 4
Vector Attraction Reduction Alternative Used: Alternative 6 (August 2014-June 2014), Alternative 1 (July 2015).

SECTION 2: ENVIRONMENTAL MANAGEMENT SYSTEM (EMS) PERFORMANCE

Environmental Management System (EMS): The biosolids EMS is a systematic approach that helps the City to continually improve activities that are associated with environmental performance. The National Biosolids Partnership (NBP) sets standards and guidelines that the City’s EMS must achieve in order to receive and maintain NBP certification. A properly implemented EMS assists the City’s Biosolids Program with the following:

- Identifying the overall goals and objectives of the Biosolids Program
- Creating a series of management practices to meet the goals and objectives
- Managing biosolids and monitoring and measuring the effectiveness of the program
- Taking corrective and preventative measures if the management practices are not operating correctly
- Conducting audits of the Biosolids EMS Program
- Requiring management involvement to make changes to the program as needed

National Biosolids Partnership: The National Biosolids Partnership is a voluntary partnership between the National Association of Clean Water Agencies (NACWA) and Water Environment Federation (WEF). NBP is committed to developing and advancing environmentally sound and sustainable biosolids best management practices through comprehensive management systems.

The mission of the NBP is to advance the understanding and adoption of effective practices in biosolids management and offer:

- Education and training;
- Technical assistance;
- An information clearinghouse; and
- An EMS-based third-party certification program for biosolids management systems.

Timeline

The EMS manual was updated periodically throughout the reporting year. The following table indicates additional biosolids EMS activities conducted during the past year.

2014-2015 EMS Activities	Date
EMS Management Review	October 2, 2015
EMS Performance Report	September 30, 2015
EMS External Third Party Audit	TBD

SECTION 2: ENVIRONMENTAL MANAGEMENT (EMS) SYSTEM PERFORMANCE (CONT.)

Goals and Objectives

The City has established goals and objectives to help improve selected biosolids management activities. These goals are updated every quarter in order to track their progress and to establish new goals and objectives when appropriate. The list of goals and objectives, which were updated on September 25, 2015, are included in *APPENDIX B: GOALS AND OBJECTIVES* of this report.

Corrective Action Notices (CANs)

As defined in EMS Element 14, Corrective Actions are “specific actions and steps taken to correct an organization’s nonconformance(s) to environmental policies, procedures, and other requirements, and to mitigate any residual impacts to the environment.” It is the policy of the Fort Worth Biosolids EMS Program to create a CAN for any identified nonconformance as well as any identified opportunities for improvement, which are those changes that are recommended but not required. See *APPENDIX A: CORRECTIVE ACTION NOTICES 2014-2015* for a full listing of the Corrective Action Notices for August 2014-July 2015.

Biosolids Policy

Once the City became subject to the new “Class AB” classification after the TCEQ amended the biosolids regulations, it was necessary to update the City’s biosolids policy as it referred to “Class A” biosolids. The new biosolids was approved in August 2015.

SECTION 3: LEGAL REQUIREMENTS

In April 2015, the City drafted a Vector Attraction Reduction (VAR) Plan for switching to a new alternative to meet VAR requirements as listed in the City’s TPDES permit. The goal was to implement an approved VAR alternative that would help minimize odor production during biosolids processing, transportation, and land application.

Odor studies conducted in 2013-2014 indicated that the addition of lime, which the City had been using as its VAR alternative, is a major contributor to odor issues. Therefore, the Water Department began to evaluate whether or not it could implement a different VAR alternative that would eliminate lime and also improve biosolids odor characteristics. Alternative 1 was immediately identified as a viable near term solution for meeting the VAR standard. The TPDES permit describes Alternative 1 as follows:

Alternative 1 – The mass of volatile solids in the sewage sludge shall be reduced by a minimum of 38%.

On July 7, 2015 the City was granted approval by the TCEQ to switch methods used to meet VAR requirements. VC personnel obtain sludge samples from selected locations and total percent solids and volatile percent solids analysis are performed on these samples. The results are then inserted into a mass balance formula that calculates the volatile solids reduction percent. The City is required to report these results on a monthly basis.

SECTION 4: SPILLS, EMERGENCY ACTIONS, AND RESPONSE

Due to the addition of Ferric chloride to digested sludge before it’s piped to the dewatering facility, the biosolids quality has improved and trucks are no longer having issues transporting the biosolids to land application sites. Last year, a decrease in dewaterability led to biosolids inadvertently leaking out through the back of trucks. There have been no tracking complaints since the addition of Ferric chloride and there was only one minor spill (less than 5 gallons) this past reporting year.

SECTION 5: PUBLIC OUTREACH AND PARTICIPATION PROGRAM

A main component of the City's EMS is to further develop and expand public outreach and public participation programs.

In early 2014 the City experienced an increase in the number of odor complaints associated with biosolids land application activities. This was further exacerbated by a negative social media campaign citing concerns with safety and human health. Because the City had not developed a proactive communication program (e.g. social media) to provide information on human health safety or the multitude of benefits attributable to land application of biosolids, a major nonconformance was cited during the third-party audit in October 2014.

In April 2015, an additional Senior Environmental Specialist was hired to be part of Village Creek Water Reclamation Facility's Environmental Health and Safety division. This position is intended to aid in additional biosolids monitoring oversight activities and be the primary person responsible for developing new public outreach.

Current public outreach projects include the development of a biosolids fact sheet that can potentially be mailed to interested parties, updating the biosolids brochure updating biosolids webpages on the City's website, creating new webpage content to post in the future, evaluating the potential use of the Water Department's social media accounts.

Tours: The City conducts tours of Village Creek and the Dewatering Facility. In 2014-2015, 44 tours were conducted at Village Creek. In all, 1238 individuals visited and toured the Village Creek facilities. During the tours, visitors are shown a presentation that includes information on the biosolids program and the dewatering facility.

During new employee orientation at Village Creek, employees are given a tour of the dewatering facility as well as a brief introduction to the EMS and biosolids program during the orientation presentation.

Notification of Land Application Activities: City personnel continue to notify county commissioners of land application activities in their precinct. This gives opportunities for county officials to ask questions about biosolids and land application should they have any.

Website & Publications: The biosolids EMS website is periodically updated on the City's internet site to promote information sharing and opportunities for public input and feedback in a timely manner. The website includes links to various audit reports, annual performance reports, and the elements of the Biosolids EMS Manual. An email address specifically for the biosolids program (biosolids@fortworthtexas.gov) is available to allow the public a direct route to express any concerns or questions about biosolids.

SECTION 6: FUTURE PLANS/ADVANCES IN BIOSOLIDS TECHNOLOGY

Ferric Chloride System: In the spring of 2014, an overall decrease in percent solids led to concerns regarding dewaterability and odor issues. In an effort to mitigate both problems a ferric chloride feed system was installed to treat the solids coming from the anaerobic digesters. Ferric Chloride is a good coagulant for wastewater treatment and is effective as a sludge dewatering agent. Since the addition of the ferric chloride system, Fort Worth is now producing drier biosolids with improved odor characteristics.



Digester Cleaning: On September 16, 2015, VC and REI began cleaning out an anaerobic digester at VC. Cleaning digesters is beneficial in that it improves the solids retention time in the digesters, which in turn helps improve with volatile solids destruction.



Pathogen Control: Because Alternative 1 is now being used to meet vector attraction reduction requirements, lime is only being used to control pathogens. However, in order to fully remove lime from the biosolids in the future, an alternative method of killing pathogens must be found. In July 2015, several chemicals were added to samples of digested sludge and sent to a lab to be tested for fecal coliform, coliphage and enteric virus. A chemical that excels at killing pathogens at a feasible cost has yet to be determined. Further testing may occur in the near future to continue exploring options that will take the place of lime in the biosolids.

SECTION 7: CONTACT INFORMATION

If you have comments on this report or any other biosolids related items please call:

Village Creek Water Reclamation Facility **817-392-4960**
Biosolids EMS Manager **817-392-4965**

To find out more information about the City of Fort Worth Biosolids Beneficial Reuse/Recycling program and the EMS visit our website:

http://fortworthtexas.gov/water/info/default.aspx?id=6094&ekmense=73b29971_1308_2386_6094_2

To find out more information on biosolids in general, biosolids facts, regulation requirements, and about the National Biosolids Partnership EMS program, visit the website: <http://www.biosolids.org>

2014-2015

City of Fort Worth, Texas
Water Department
Village Creek Water Reclamation Facility
Biosolids Management Program and EMS Performance Report

APPENDIX A: CORRECTIVE ACTION NOTICES 2014-2015

CORRECTIVE ACTION NOTICES AUGUST 2014-JULY 2015

CAN #	Date	Non-Conformance Issue	Scheduled Completion Date	Actual Completion Date	Close-Out Date
2014-03	09-22-14	Requirement 10.1: Minor Nonconformance (Internal Audit). Develop and implement standard operating procedures, work management practices or other appropriate methods at all critical control points throughout the biosolids value chain to effectively manage potential environmental impacts. Procedures regarding how complaints are documented have not been followed in their entirety.	09-25-14	09-25-14	09-25-14
2014-04	09-25-2014	Requirement 12.2(c): Minor Nonconformance (Internal Audit). Establish and maintain document control procedures and practices to ensure that the EMS program documentation and documents are kept up to date through periodic reviews and revisions (if applicable).	09-25-14	10-06-14	10-08-14
2014-05	11-05-14	Requirement 9.1: Major Nonconformance (third-party audit). The standard requires that the organization establish and maintain a proactive communication program that provides ongoing information about the BMP to interested parties and the public, consistent with local circumstances, the method of biosolids management, public communication history, and degree of current interest in its biosolids management activities.	05-31-15	Pending	Pending
2014-06	11-05-14	Requirement 6.2: Minor Nonconformance (third party audit). The Fort Worth Public Participation in Planning EMS Element 6.0 procedure indicates that the City shall notify landowners of upcoming interim and verification audits. There was no evidence available to demonstrate that landowners were provided notification of the most recent interim audit. (Note: a key area of interpretation of this element is that the procedure address approaches for interested parties to observe the third party audit.)	03-31-15	Pending	Pending
2014-07	11-05-14	Requirement 2.1: Opportunity for Improvement (third party audit). Consider obtaining approval of the proposed EMS policy statement that includes changes recommended during the most recent management review.	12-31-14	08-27-15	09-10-15
2014-08	11-05-14	Requirement 5.1: Opportunity for Improvement (third party audit) Consider quantifying the goal associated with sludge de-gritting disposal as an increase of grit collected in measureable units such as volume (cubic yards) or weight (pounds or tons).	12-31-14	01-12-15	01-15-15
2014-09	11-05-14	Requirement 5.1: Opportunity for Improvement (third party audit). Several goals associated with odor control established a measureable goal of reducing odor complaints to the number received in 2008. Consider specifying a number of complaints as a baseline (e.g. 45) and establishing a goal to reduce that number each year for the next few years, identifying a specific numerical goal for each year. Also consider clarifying that the complaint count is associated with biosolids land application activities only.	12-31-15	01-12-15	01-15-15

CORECTIVE ACTION NOTICES AUGUST 2014-JULY 2015 (CONT.)

2014-10	11-05-14	Requirement 5.2: Opportunity for Improvement (third party audit). Consider developing a goal and objective to quantify the annual operating cost of producing and beneficially using biosolids. Consider including a detailed breakdown of amortized capital costs, cost of labor, cost of materials and supplies, and cost of energy. Also consider identification of costs attributable to each of the critical control points in the biosolids value chain.	11-05-14	12-31-14	09-28-15
2014-11	11-05-14	Requirement 5.7: Opportunity for Improvement (third party audit). Review the biosolids goals and objectives and consider whether some are actually action plans that describe steps to accomplish a common goal.	12-31-14	01-12-15	01-12-15
2014-12	11-05-14	Requirement 9.1: Opportunity for Improvement (third party audit). Consider having a farmer who has used biosolids on his/her land for many years; participate in the creation of a video (or You-Tube) to explain the benefits of farming using biosolids.	12-31-14	Pending	Pending
2014-13	11-05-14	Requirement 10.1: Opportunity for Improvement (third party audit). Consider updating the Land Application Site Visit Standard Operating Procedure (SOP) to include the new Texas 312 regulatory requirements.	12-31-14	03-20-15	03-20-15

2014-2015

City of Fort Worth, Texas
Water Department
Village Creek Water Reclamation Facility
Biosolids Management Program and EMS Performance Report

APPENDIX B: GOALS AND OBJECTIVES

2013-2014

GOAL: Increase grit collected and removed by 10,500 lbs/day				
Objective: Increase grit collected and removed by 10,500 lbs/day				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Install Grit Removal System				
1. Quantify grit removal by clarifiers	Ana Pena-Sr. Professional Engineer	June 30, 2014	Complete (March 13, 2014) (May 27, 2014) (June 9, 2014)	<ul style="list-style-type: none"> • Environmental Performance • Regulatory Compliance • Improve Biosolids Management Practices
2. Install grit removal alternative (grit dewatering and storage)	Ana Pena-Sr. Professional Engineer	July 16, 2014	Complete (September 12, 2014)	
3. Collect grit sample to verify compliance with landfill disposal requirements	Ana Pena-Sr. Professional Engineer	July 16, 2014	Complete (July 16, 2014)	
4. Installation of grit washer	Ana Pena-Sr. Professional Engineer	September 15, 2014	Complete (September 15, 2014)	
5. Begin hauling grit to landfill	Ana Pena-Sr. Professional Engineer	August 1, 2014	Complete (September 19, 2014)	
6. One month trial period to evaluate effectiveness	Ana Pena-Sr. Professional Engineer	August 19, 2014	Complete (September 19, 2014)	
7. Troubleshoot system and make modifications	Ana Pena-Sr. Professional Engineer	December 31, 2015	Not complete	
8. Monitor grit production	Ana Pena-Sr. Professional Engineer	March 31, 2016	Not complete	
Notes/Comments:				
<ul style="list-style-type: none"> •An initial trial of the grit removal system occurred on 6-16-14 and continued overnight. The initial grit removed on 6-16-14 was collected as well as another sample collected on the morning of 6-17-14. They were submitted together as one sample for a paint filter test and TCLP. The grit removal system incurred some issues after it ran overnight. The dates for objectives 2 and 3 were modified to reflect when the grit removal system would be ready again. •In October, the grit classifiers were modified with sprayers, but the prewashed product did not pass the paint test necessary for landfill disposal. Additional parts and equipment are needed to make modifications on the corkscrew mechanism for the grit disposal apparatus. •From November 2014 to January 2015, grit was going to either Renda or the landfill. •From mid-February 2015 to March 2015, grit was being disposed of to the landfill. •Troubleshooting/modifications will occur concurrently with monitoring as the grit will still go to the roll off dumpsters. •Troubleshooting/modifications continue as of the September 2015 update. 				

2013-2014

GOAL: Reduce Odor Complaints from Reporting Year 2013-2014 by 50% (46 complaints/year to 23 complaints)*				
Objective: Reduce Odor Complaints from reporting year 2013-2014 by 50% (46 complaints to 23 complaints)				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Biosolids Master Plan				
1. Award contract for project	Steven L. Nutter-Biosolids EMS Manager	April 30, 2012	Complete	
2. Workshop 1 (Kickoff)	Steven L. Nutter-Biosolids EMS Manager	June 7, 2013	Complete	
3. Submit formal data request	Steven L. Nutter-Biosolids EMS Manager	June 21, 2013	Complete	
4. TMs 1 and 2 Draft (Regulatory & Data)	Steven L. Nutter-Biosolids EMS Manager	July 26, 2013	Complete (September 24, 2013)	
5. Workshop 2 (Criteria & Long List Selection)	Steven L. Nutter-Biosolids EMS Manager	August 26, 2013	Complete (September 25, 2013)	
6. TM 3 Draft Model and short-term)	Steven L. Nutter-Biosolids EMS Manager	September 23, 2013	Complete (October 22, 2013)	
7. Workshop 3 (Screen Alternatives)	Steven L. Nutter-Biosolids EMS Manager	November 19, 2013	Complete (September 26, 2013)	
8. TM 4 Draft (Market Analysis)	Steven L. Nutter-Biosolids EMS Manager	December 20, 2013	Complete (November 18, 2013)	
9. TM 5 Draft (Detailed Analysis)	Steven L. Nutter-Biosolids EMS Manager	January 7 & 8, 2014	Complete (January 7&8 2014)	
10. Workshop 4 (Detailed Analysis)	Steven L. Nutter-Biosolids EMS Manager	March 17, 2014	Complete (March 17, 2014)	<ul style="list-style-type: none"> • Environmental Performance
11. TM 6 Draft (Long Term Plan)	Steven L. Nutter-Biosolids EMS Manager	March 28, 2014	Complete (March 14, 2014)	<ul style="list-style-type: none"> • Improve Biosolids Management Practices
12. Workshop 5 (Long Term Plan)	Steven L. Nutter-Biosolids EMS Manager	April 14, 2014	Complete (March 17, 2014)	
13. Draft Master Plan Report	Steven L. Nutter-Biosolids EMS Manager	June 9, 2014	Complete (July 18, 2014)	<ul style="list-style-type: none"> • Regulatory Compliance
14. Final Master Plan Report	Steven L. Nutter-Biosolids EMS Manager	January 31, 2015	Not Complete	
15. Contract Review Workshop	Steven L. Nutter-Biosolids EMS Manager	March 14, 2014	Complete (October 1, 2014)	<ul style="list-style-type: none"> • Improve Public Relations
16. Draft Contract Finalized	Steven L. Nutter-Biosolids EMS Manager	April 30, 2015	Complete (April 30, 2015)	
17. Finalize Master Plan and Evaluate	Steven L. Nutter-Biosolids EMS Manager	February 1, 2016	Not Complete	
18. Develop action plan	Steven L. Nutter-Biosolids EMS Manager	June 1, 2016	Not Complete	
ACTION PLAN: COMPLETED	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Arcadis Biosolids Study-Evaluate Solids Production at Village Creek and SOL				
1. Arcadis hired to perform study	Steven L. Nutter-Biosolids EMS Manager	April 2, 2014	Complete (2 April 2014)	
2. Arcadis performs site visits of Fort Worth Facilities	Steven L. Nutter-Biosolids EMS Manager	May 1, 2014	Complete (1 May 2014)	
3. Data acquisition begins-creation of Arcadis server for uploading files	Steven L. Nutter-Biosolids EMS Manager	May 6, 2014,	Complete (6 May 2014)	
4. Arcadis performs site visit and review of the dewatering facility	Steven L. Nutter-Biosolids EMS Manager	May 28, 2014	Complete (28 May 2014)	

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5.	Arcadis submits technical memo on dewatering facility site visit	Steven L. Nutter-Biosolids EMS Manager	June 19, 2014	Complete (19 June 2014)
6.	Biosolids odor sampling	Steven L. Nutter-Biosolids EMS Manager		
7.	Draft Report Issued	Steven L. Nutter-Biosolids EMS Manager		
8.	Arcadis submits technical memo on impact of process operations at WTPs and VCWRF on odor generation	Steven L. Nutter-Biosolids EMS Manager		
<i>The technical memo issued in November will act as Arcadis' final report. The technical memo included suggestions for VCWRF to consider in regards to mitigating odors.</i>				
ACTION PLAN: COMPLETED				
Study to Evaluate Biosolids Odors Associated with High Strength Wastes, Polymer, Lime Addition (Perkins Study)		RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS
1.	Hire consultant	Steven L. Nutter-Biosolids EMS Manager	July 5, 2013	Complete
2.	Consultant-Develop scope of work and sampling plan	Steven L. Nutter-Biosolids EMS Manager Perkins Engineering Consultants, Inc.	July 31, 2013	Complete (July 30, 2013)
3.a	Perform sampling and analysis to evaluate odors associated with lime addition	Village Creek Personnel & Perkins Engineering Consultants, Inc.	October 31, 2013	Complete (October 21, 2013)
3.b	Perform sampling and analysis to evaluate odors associated with high strength wastes	Village Creek Personnel & Perkins Engineering Consultants, Inc.	October 31, 2013	Complete (October 14, 2013)
3.c	Perform sampling and analysis to evaluate odors associated with polymers	Village Creek Personnel & Perkins Engineering Consultants, Inc.	November 18, 2013	Complete (November 18, 2013)
3.d	Perform sampling and analysis to evaluate odors associated with lime dosage	Village Creek Personnel & Perkins Engineering Consultants, Inc.	December 10, 2013	Complete (December 10, 2013)
4.	Consultant-Produce Technical report summarizing issues found during study	Perkins Engineering Consultants, Inc.	June 30, 2014	Complete (June 30, 2014)
5.	Evaluate report & develop action plan	Steven L. Nutter-Biosolids EMS Manager	July 31, 2014	Complete (June 30, 2014)
<i>The Perkins technical report shows conclusively that lime has a profound impact on odor generation. As such a new Goal & Objective has been developed for determining the feasibility of eliminating lime from the process (i.e. switching from vector attraction reduction alternative #6 to alternative #1)</i>				
Notes/Comments:				
<ul style="list-style-type: none"> Complaint count is from biosolids land application activities only. This goal was added in response to public feedback regarding the consistency of the biosolids product- See Public Outreach Evaluation Form from November 8, 2013. This Arcadis study is a comprehensive study analyzing the activities at the water treatment plants, Village Creek Water Reclamation Facility, and the dewatering facility at the Sludge Only Landfill and their effect on the overall quality of the biosolids material and its odors. 				

GOAL: Increase gas production by at least 5% during the scum addition interval*				
Objective: Increase gas production by at least 5% during the scum addition interval*				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Utilize Scum Screenings as Organic Source for Co-Digestion				
1. Kick-off/Chartering Meeting	Ana Pena-Sr. Professional Engineer	March 5, 2014	Complete (March 5, 2014)	<ul style="list-style-type: none"> • Environmental Performance • Regulatory Compliance • Improve Biosolids Management Practices
2. Submit Preliminary Design	Ana Pena-Sr. Professional Engineer	April 17, 2014	Complete (April 17, 2014)	
3. Preliminary Design Review Meeting	Ana Pena-Sr. Professional Engineer	May 2, 2014	Complete (May 2, 2014)	
4. Final Design Review Meeting	Ana Pena-Sr. Professional Engineer	June 17, 2014	Complete (May 22, 2014)	
5. Deliver Construction Documents	Ana Pena-Sr. Professional Engineer	July 2, 2014	Complete (June 2, 2014)	
6. Begin construction	Ana Pena-Sr. Professional Engineer	July 2, 2014	Complete (July 2, 2014)	
7. Complete construction	Ana Pena-Sr. Professional Engineer	April 30, 2015	Complete (April 30, 2015)	
8. Determine amount of gas production attributable to the addition of the scum screenings at the end of 3 months.	Ana Pena-Sr. Professional Engineer	December 31, 2015	Not complete	
Notes/Comments:				
<ul style="list-style-type: none"> • How long the scum system will be running when it's in operation has yet to be determined. Because the scum system may run intermittently or as necessary, the goal is to see an increase in gas production for all digesters digesters 9-14 when the scum system is running. The co-digestion feed will have to be taken out of account when determining what effect the scum system <i>alone</i> has on gas production. • System was down for the month of May. • Operational issues involving tanks, pumps, screens and power have delayed progress on this goal since the June 2015 update. An SOP is still being modified and it is believed by October 2015, most of the operational issues will be fixed. October-December will mark the 3 month period mentioned in step 8. above whereby the total gas produced from all digesters will be quantified and compared to data from before the scum screen was added. 				

GOAL: Increase digested sludge percent solids to at least 2.5% for 90% of the time during a given month				
Objective: Increase digested sludge percent solids to at least 2.5% for 90% of the time during a given month				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Install 3 rd GBT unit to increase solids stability				
1. Conceptual Design	Ana Pena-Sr. Professional Engineer	December 2012	Complete (December 2012)	<ul style="list-style-type: none"> • Environmental Performance • Regulatory Compliance • Improve Biosolids Management Practices
2. Final Design	Ana Pena-Sr. Professional Engineer	May 2013	Complete (May 2013)	
3. Begin construction	Ana Pena-Sr. Professional Engineer	November 20, 2012	Complete (November 20, 2012)	
4. Complete construction	Ana Pena-Sr. Professional Engineer	October 31, 2015	Not complete	
5. Evaluate effectiveness of additional GBT unit on solids stability.	Ana Pena-Sr. Professional Engineer	November 30, 2015	Not complete	
Notes/Comments:				
<ul style="list-style-type: none"> • It is expected by May of 2015 that there will be sufficient data to be able to determine if digested sludge percent solids have increased. • Data from 2012/2013 (pre-GBTs) will be examined in conjunction with data collected after the third GBT is installed in order to determine effectiveness. • Progress for this goal has been delayed due to troubleshooting the thickening pumps and solving electrical problems. 				

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GOAL: Increase percent solids of biosolids (prior to lime addition) by 3%				
Objective: Increase percent solids of biosolids (prior to lime addition) by 3%				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Dewatering Facility Upgrades				
1. Hire consultant	Steven L. Nutter-Biosolids EMS Manager	April 18, 2014	Complete (April 18, 2014)	<ul style="list-style-type: none"> • Environmental Performance • Regulatory Compliance • Improve Biosolids Management Practices
2. Electrical System Evaluation	Steven L. Nutter-Biosolids EMS Manager	July 11, 2014	Complete (August 27, 2014)	
3. Final Design	Steven L. Nutter-Biosolids EMS Manager	September 30, 2014	Complete (August 29, 2014)	
4. Funding approved by City Council	Steven L. Nutter-Biosolids EMS Manager	October 20, 2015	Not complete	
5. Start construction on 6 th belt press, polymer, and lime systems.	Steven L. Nutter-Biosolids EMS Manager	February 1, 2016	Not complete	
6. Finish construction of 6 th belt press, new polymer and lime systems.	Steven L. Nutter-Biosolids EMS Manager	June 1, 2016	Not complete	
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Increase dewaterability at the belt presses				
1. Corroborate presence of struvite (collect samples)	Ana Pena-Sr. Professional Engineer	July 7, 2014	Complete (July 7, 2014)	
2. Install ferric sulfate addition station	Ana Pena-Sr. Professional Engineer	August 18, 2014	Complete (August 18, 2014)	
3. Install ferric chloride addition station*	Ana Pena-Sr. Professional Engineer	November 25, 2014	Complete (November 24, 2014)	
4. Installation of Total Solids and Total Suspended Solids meters	Ana Pena-Sr. Professional Engineer	April 30, 2015	Complete (April 30, 2015)	
5. Optimize dosage of ferric chloride	Ana Pena-Sr. Professional Engineer	October 31, 2015	Not complete	
Notes/Comments:				
<ul style="list-style-type: none"> • After ferric sulfate was added, it was determined that the dosage and the chemical itself were not as effective as needed. Therefore a switch was made to ferric chloride, which resulted in a different feed station being built to accommodate the volume necessary to achieve an effective dosage. The addition of ferric chloride should result in the added benefits of minimizing struvite buildup at the dewatering facility and reducing odors. • Dosage optimization was supposed to be complete by May, but because the HRC was in use (which adds Ferric sulfate), an increase in percent solids could not be attributed to the ferric chloride alone therefore the milestone complete date was changed. • The TSS meter was relocated in August 2015. As of September 2015, the ferric chloride contract is being extended through the end of the year. Ferric Chloride dose optimization is still being determined. 				

GOAL: Increase TSS Removal in Primaries by 80%				
Objective: Increase TSS Removal in Primaries by 80%				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Increase settling in primary clarifiers				
1. CEPT study via jar testing	Ana Pena-Sr. Professional Engineer	December 5, 2014	Complete (December 5, 2014)	<ul style="list-style-type: none"> • Environmental Performance • Improve Biosolids Management Practices
2. Evaluate and review draft CEPT study report	Ana Pena-Sr. Professional Engineer	April 21, 2015	Complete (April 21, 2015)	
3. Get chemical contracts in place	Ana Pena-Sr. Professional Engineer	October 31, 2015	Not complete	
4. Implement chemical feed	Ana Pena-Sr. Professional Engineer	November 30, 2015	Not complete	
5. Optimize dosage	Ana Pena-Sr. Professional Engineer	December 31, 2015	Not complete	
Notes/Comments:				
<ul style="list-style-type: none"> • CEPT=Chemically Enhanced Primary Treatment 				

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GOAL: Increase biosolids production and storage capacity by 100%				
Objective: Increase biosolids production and storage capacity by 100%				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Install additional belt presses				
1. Hire Consultant for Design Work	Steven L. Nutter-Biosolids EMS Manager Ana Pena-Sr. Professional Engineer	May 20, 2015	Complete (May 20, 2015)	<ul style="list-style-type: none"> • Environmental Performance • Regulatory Compliance • Improve Biosolids Management Practices
2. Finalize Scope of Work	Steven L. Nutter-Biosolids EMS Manager Ana Pena-Sr. Professional Engineer	December 31, 2015	Not Complete	
3. Finish Conceptual design	Steven L. Nutter-Biosolids EMS Manager Ana Pena-Sr. Professional Engineer	June 30, 2016	Not complete	
4. Final design phase	Steven L. Nutter-Biosolids EMS Manager Ana Pena-Sr. Professional Engineer	December 31, 2016	Not complete	
5. Begin construction	Steven L. Nutter-Biosolids EMS Manager Ana Pena-Sr. Professional Engineer	June 30, 2017	Not complete	
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	
Install liquid sludge storage tanks				
1. Hire Consultant for Design Work	Steven L. Nutter-Biosolids EMS Manager	April 20, 2015	Complete (April 20, 2015)	
2. Finalize Scope of Work	Steven L. Nutter-Biosolids EMS Manager	July 10, 2015	Complete (July 10, 2015)	
3. Finish Conceptual design	Steven L. Nutter-Biosolids EMS Manager	December 31, 2015	Not complete	
4. Final design phase	Steven L. Nutter-Biosolids EMS Manager	June 30, 2016	Not complete	
5. Begin construction	Steven L. Nutter-Biosolids EMS Manager	December 31, 2016	Not complete	
Notes/Comments:				
<ul style="list-style-type: none"> • None. 				

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GOAL: Increase digested feed sludge by 5%				
Objective: Increase digested feed sludge by 5%				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
VCWRF Thickener Process Study				
1. Hire Consultant For Design Work	Ana Pena – Sr. Professional Engineer	June 15, 2015	Complete (June 15, 2015)	<ul style="list-style-type: none"> • Environmental Performance • Improve Biosolids Management Practices
2. Finalize Scope of Work	Ana Pena – Sr. Professional Engineer	July 15, 2015	Complete (July 15, 2015)	
3. Finish Conceptual design	Ana Pena-Sr. Professional Engineer	March 31, 2016	Not complete	
4. Final design phase	Ana Pena-Sr. Professional Engineer	February 28, 2017	Not complete	
5. Begin construction	Ana Pena-Sr. Professional Engineer	June 30, 2017	Not complete	
Notes/Comments:				
<ul style="list-style-type: none"> • The purpose it to look into a new thickening technology that will replace the DAFTs. 				

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GOAL: Identify four public concerns regarding biosolids				
Objective: Identify four public concerns regarding biosolids				
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	KEY OUTCOMES
Determine concerns based on feedback received from interested parties.				
1. Identify four (4) public/third party concerns	VCWRF Biosolids personnel	September 15, 2015	Complete (September 23, 2015)	• Improve Public Relations
Concern #1= "The City of Fort Worth biosolids webpages are out of date." Concern #2= "The EPA and TCEQ standards are not strict enough." Concern #3= "Too much about biosolids are unknown." Concern #4= "Are there pharmaceuticals and personal care products (PPCPs) in biosolids?"				
2. For each concern, either contact three (3) interested parties or conduct presentation with one (1) interested party*	VCWRF Biosolids personnel	December 31, 2015	Not complete	
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	
Improve ability to identify concerns via mailouts				
1. Contact the communication and outreach division to determine if mailouts (surveys, fact sheets, etc.) are feasible	VCWRF Biosolids personnel	July 31, 2015	Complete (June 12, 2015)	
2. Determine if GIS department can acquire mailing addresses for residents around land sites	VCWRF Biosolids personnel	August 7, 2015	Complete (September 14, 2015)	
3. Develop information Fact Sheet to be mailed to interested parties	VCWRF Biosolids personnel	October 15, 2015	Not complete	
4. Determine if addresses can be purchased to mail out Fact Sheet	VCWRF Biosolids personnel	October 31, 2015	Not complete	
5. Determine if fact sheet can be mailed to addresses surrounding land application sites	VCWRF Biosolids personnel	October 31, 2015	Not complete	
ACTION PLAN:	RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS	
Improve ability to identify concerns using the Water Department's social media accounts				
1. Contact the Communication and Outreach division to determine what content can be posted to the Water Department's social media accounts (Facebook & Twitter)	VCWRF Biosolids personnel	July 31, 2015	Complete (June 12, 2015)	
2. Begin posting biosolids information to Water Department's Facebook account	VCWRF Biosolids personnel	October 31, 2015	Not complete	

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ACTION PLAN:		RESPONSIBLE PARTY	MILESTONE COMPLETION DATE	STATUS
Improve ability to address public concerns by updating Biosolids webpage				
1a.	Update grammar and typographical errors	VCWRF Biosolids personnel	August 31, 2015	Complete (August 17, 2015)
1b.	Remove outdated information	VCWRF Biosolids personnel	August 31, 2015	Complete (September 17, 2015)
1c.	Update tables on webpages	VCWRF Biosolids personnel	August 31, 2015	Not complete
2a.	Add additional webpage for biosolids brochure	VCWRF Biosolids personnel	October 31, 2015	Not complete
2b.	Add additional webpage for Fact Sheet (developed from 2 nd action plan above)	VCWRF Biosolids personnel	September 30, 2015	Not complete
2c.	Add additional webpage for facts not listed in Fact Sheet	VCWRF Biosolids personnel	October 31, 2015	Not complete
Notes/Comments:				
<ul style="list-style-type: none"> • *Contact may involve providing literature or documentation regarding the City's biosolids program or inviting interested parties for tours of the Village Creek Water Reclamation Facility and Dewatering Facility. • Additional steps may be added to the action plans once feasibility of the outreach activity has been determined. • The GIS department was contacted on August 7th regarding whether they were able to gather mailing addresses for residents surrounding land application sites. On September 14, 2015 the GIS department notified biosolids personnel that they were unable to acquire the addresses. • Due to changes to the City's website policies the Water Department's Communication and Outreach division informed biosolids personnel that posting PDF documents to the City's webpages should be avoided as much as possible to comply with the Americans with Disabilities Act (ADA) requirements. Therefore, new information will be added as additional webpages if possible. See Action Plan: Add additional biosolids webpages. 				