BACWA
BAY AREA
CLEAN WATER
AGENCIES

ANNUAL REPORT to the
SOLANO COUNTY BOARD OF SUPERVISORS

LAND APPLICATION OF BIOSOLIDS in SOLANO COUNTY

Prepared by the BACWA Biosolids Committee
December 2014

Introduction

With the 2014 application season recently completed, the Bay Area Clean Water Agencies (BACWA) is pleased to present its annual summary report on land application of biosolids in Solano County. BACWA wishes to express its sincere appreciation to the staff of the Environmental Health Services Division of the Department of Resource Management for the continuing support of the biosolids land spreading program, which permits many of our member agencies to continue to apply biosolids to agricultural land in the County. We believe this partnership provides a valuable resource to the Solano County agricultural industry and provides many Bay Area agencies with an opportunity to cost-effectively recycle biosolids and make a positive impact on the environment.

This report provides information on trends in the use of biosolids resources in California and the Bay Area, an update on regional biosolids programs, and specific information on projects and other efforts by individual agencies currently applying biosolids in the County, highlighting each agency's compliance with the requirement in Chapter 25, Article IV, Sec. 25-400 that "Class B biosolids may only be land applied provided that the generator of the Class B biosolids is individually or as part of a consortium having a portion of their biosolids produced as Class A Exceptional Quality biosolids, converting biosolids to energy, or otherwise diverting Class B biosolids away from land spreading or landfilling (as waste or as Alternative Daily Cover)." This report is intended as supplemental information to the report submitted by the County Department of Resource Management staff and by Synagro, contract haulers and applicators of biosolids. In 2014, there was one permit violation for tracking biosolids into the roadway, no regulatory issues, and only one complaint about excessive flies that was not substantiated by Resource Management staff.

This report has been prepared for the Solano County Board of Supervisors in response to the Board's request for an annual update on agency activities and progress towards compliance with the goals set forth in County Code (Chapter 25). The affected agencies have coordinated the required reporting through BACWA to produce a single report for the Board.

We would like to acknowledge the assistance of your staff in working with BACWA member agencies throughout the year, particularly Mr. Terry Schmidtbauer, Mr. Jeffrey Bell, Ms. Misty Kaltreider, and Mr. Matthew Geisert.

Municipal Agencies Applying Biosolids in Solano County

The application of biosolids provides soil amendments and nutrients to enhance the productivity of the farm land using natural, recycled materials. Each agency that applies biosolids is required to meet strict standards and provides a report annually to the United States Environmental Protection Agency (USEPA) to demonstrate compliance. The following twelve Bay Area agencies currently transport biosolids to agricultural land in Solano County under contract with Synagro:

City of Burlingame
City of Calistoga
City of Millbrae
City of Pacifica
City of San Mateo
City of Sunnyvale
Delta Diablo Sanitation District
El Dorado Irrigation District (Deer Creek)
North San Mateo County Sanitation District (Daly City)
San Francisco Public Utilities Commission
Southeast WPCP (SF-SEP)
Oceanside WPCP(SF-OSP)
Silicon Valley Clean Water (serving Belmont, Redwood City and San Carlos) (SVCW)
Union Sanitary District (serving Fremont, Newark and Union City)

A total of 6,552 dry tons were land applied on agricultural sites in Solano County in 2014. The proportion from each agency is shown in Figure 1.

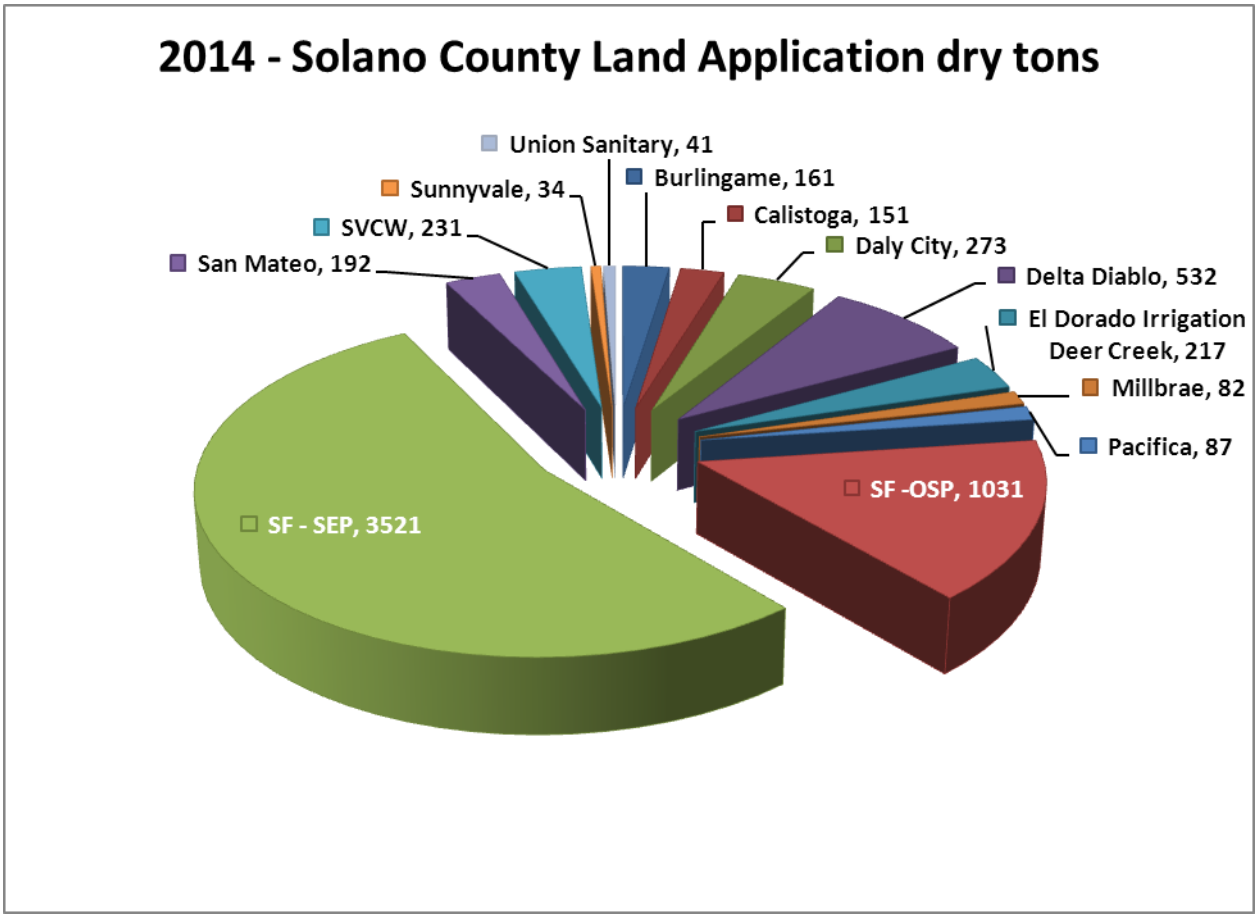

Figure 1. Amount of Biosolids Applied in Solano County by Each Agency in dry tons (2014). ***(Data provided by Synagro).***

Data provided by Synagro indicates that the total quantity of biosolids applied to agricultural land in Solano County increased by nearly 1,600 dry tons (increase of 32%) compared with the 2013 application season. This represents a return to the amount applied during the 2012 season. This change is due to the effort on the behalf of Synagro to broaden the agency

participation in the program to assure its sustainability to supply farmers with this valuable resource.

Trends in Biosolids Usage in California

In general, municipal agencies in California are continuing to explore options for reuse, recycling and disposal of biosolids and are evaluating available technologies for extracting energy and nutrients. Traditional uses still dominate the biosolids landscape, however, primarily due to cost and reliability factors. Other efforts include development of processes for production of Class A biosolids.

Overall Use Summary. Figure 2 summarizes the use of biosolids in California for calendar years 2009 through 2013. Data for 2014 are not yet available and will be included in the 2015 report. The number one use statewide continues to be land application in various forms, including compost, Class B and Class A applications. Class B and compost dominate the land application options, and are evenly split – each between 20% and 26%, depending on the year under review. Biosolids have proven to be a safe, reliable and nutrient-rich soil amendment that offers a more cost-effective alternative to chemical fertilizers, which are increasingly expensive and very energy intensive to produce. Other significant methods for beneficial use and disposal include alternate daily cover (and other approved uses as a soil substitute) at landfills and landfill burial (or disposal).

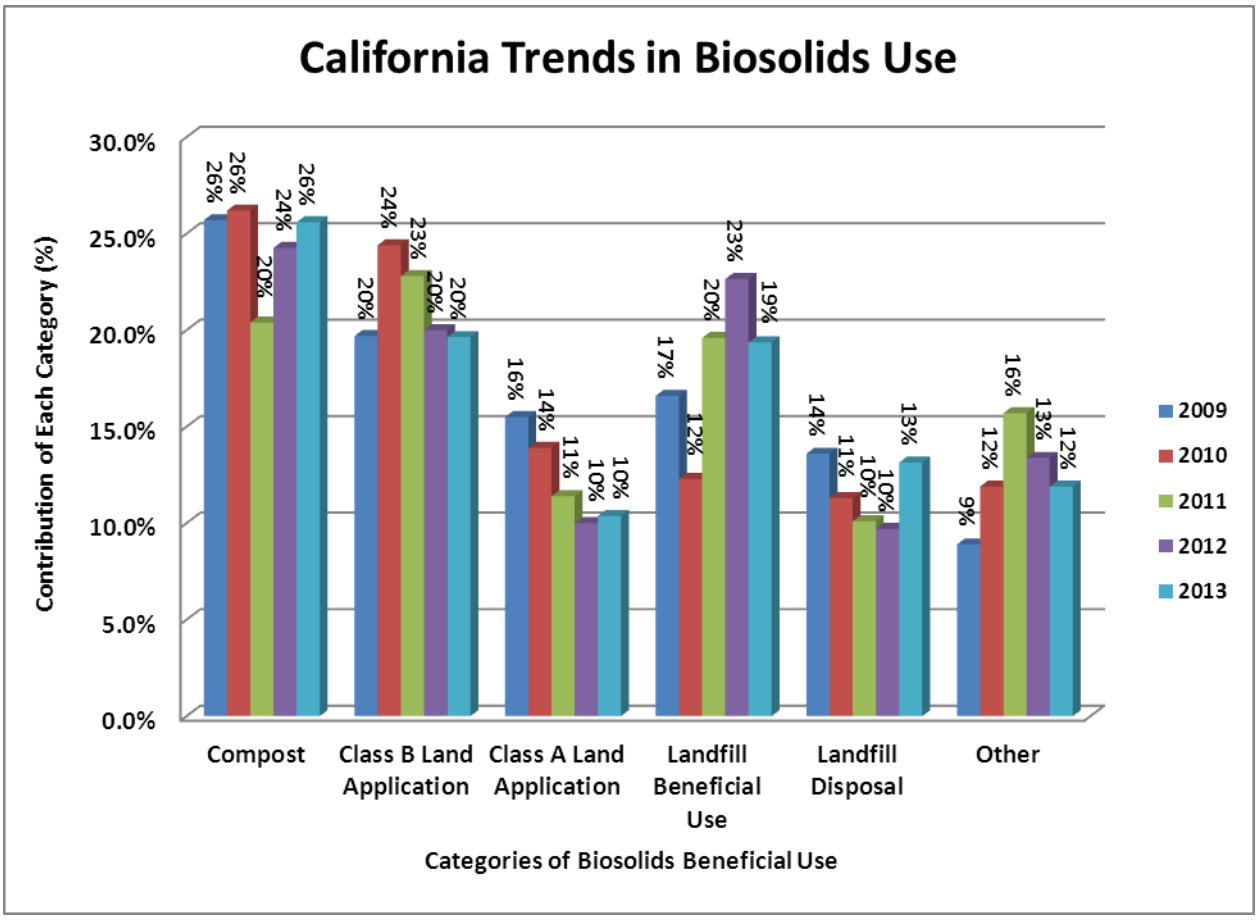

Figure 2. California Trends in Biosolids Use for the Years 2009 to 2013. ***(Data provided by EPA Region 9).***

Bay Area Trends. In focusing on the Bay Area, Figure 3 illustrates uses of biosolids in the nine Bay Area counties. The primary uses are landfill beneficial use, land application and incineration. It should be noted that since 2012, landfill disposal more than doubled from approximately 4% to 11% and landfill beneficial use declined by an equal percentage.

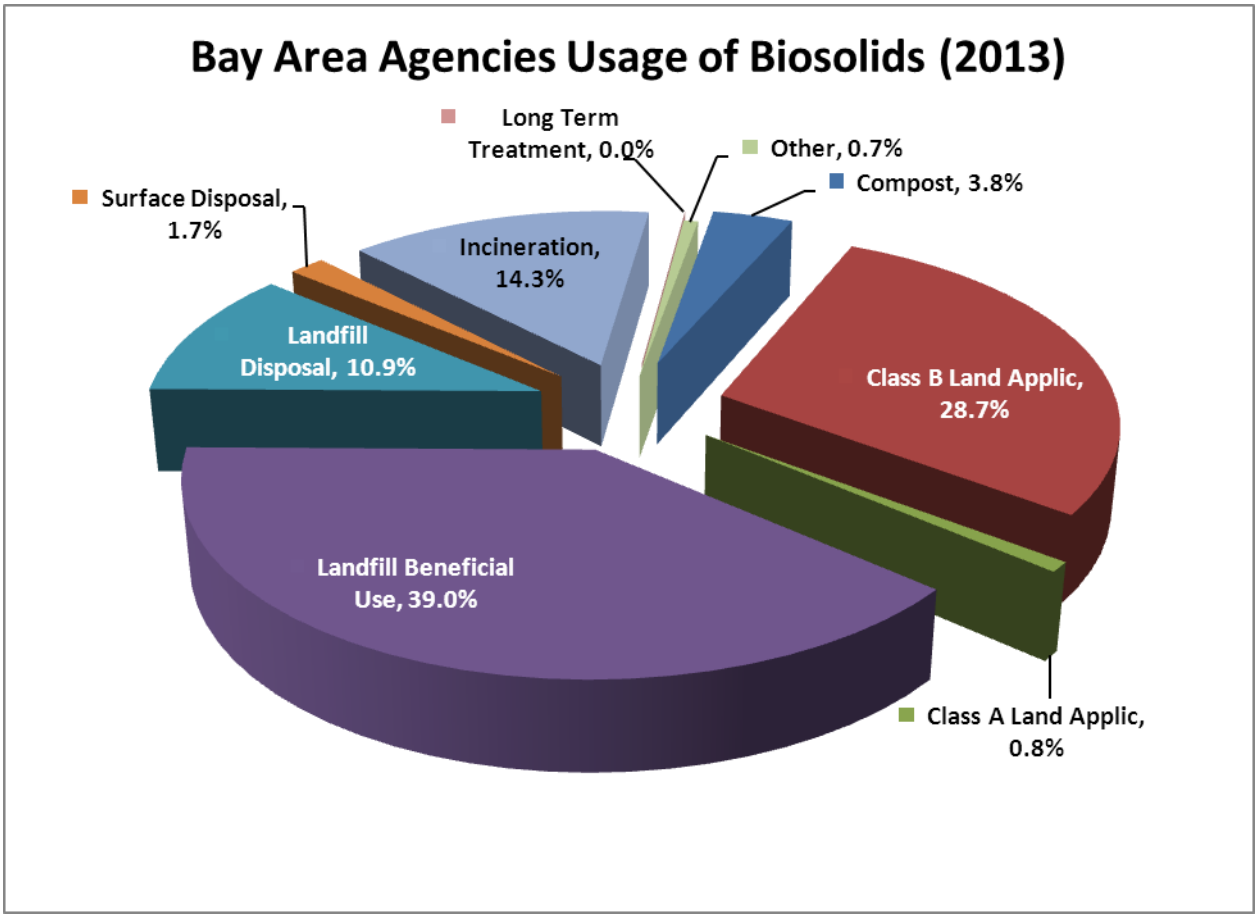

Figure 3. Bay Area Agencies Usage of Biosolids (2013). *(Data Provided by EPA Region 9).*
(Other typically includes storage and long-term treatment)

In 2013, biosolids produced in the Bay Area were ultimately distributed to landfills and land application sites in twelve counties. Solano and Santa Clara Counties received the largest share at approximately 27.3% and 20.3%, respectively. Merced, Sacramento and Alameda Counties received 13.2%, 12.1% and 11.1%, respectively, while Sonoma received 9.2%. Other counties that received biosolids include Contra Costa, Marin, Monterey, Napa, San Mateo and Yolo. Total biosolids exported to Solano County were divided between landfill beneficial use and agricultural land application. Approximately 83% of imported biosolids were placed in landfills and 17% were land applied. The predominant change from previous years is the continued increase in biosolids being converted to Class A compost – this fraction increased from 1.7% in 2011 to 3.1% in 2012 to 3.8% in 2013. It is expected that this trend will continue because of the requirements of Solano County Code (Chapter 25) and, in coming years, further restriction of

the beneficial use of biosolids as Alternative Daily Cover.

Biosolids were applied to agricultural land in six different Northern California counties in 2013 with Solano County ranking 4th, receiving 7.9%. This represents a slight decrease from 9.8% in 2012 and continues the trend observed over the last several years. Figure 4 illustrates the distribution of land applied biosolids among the various counties.

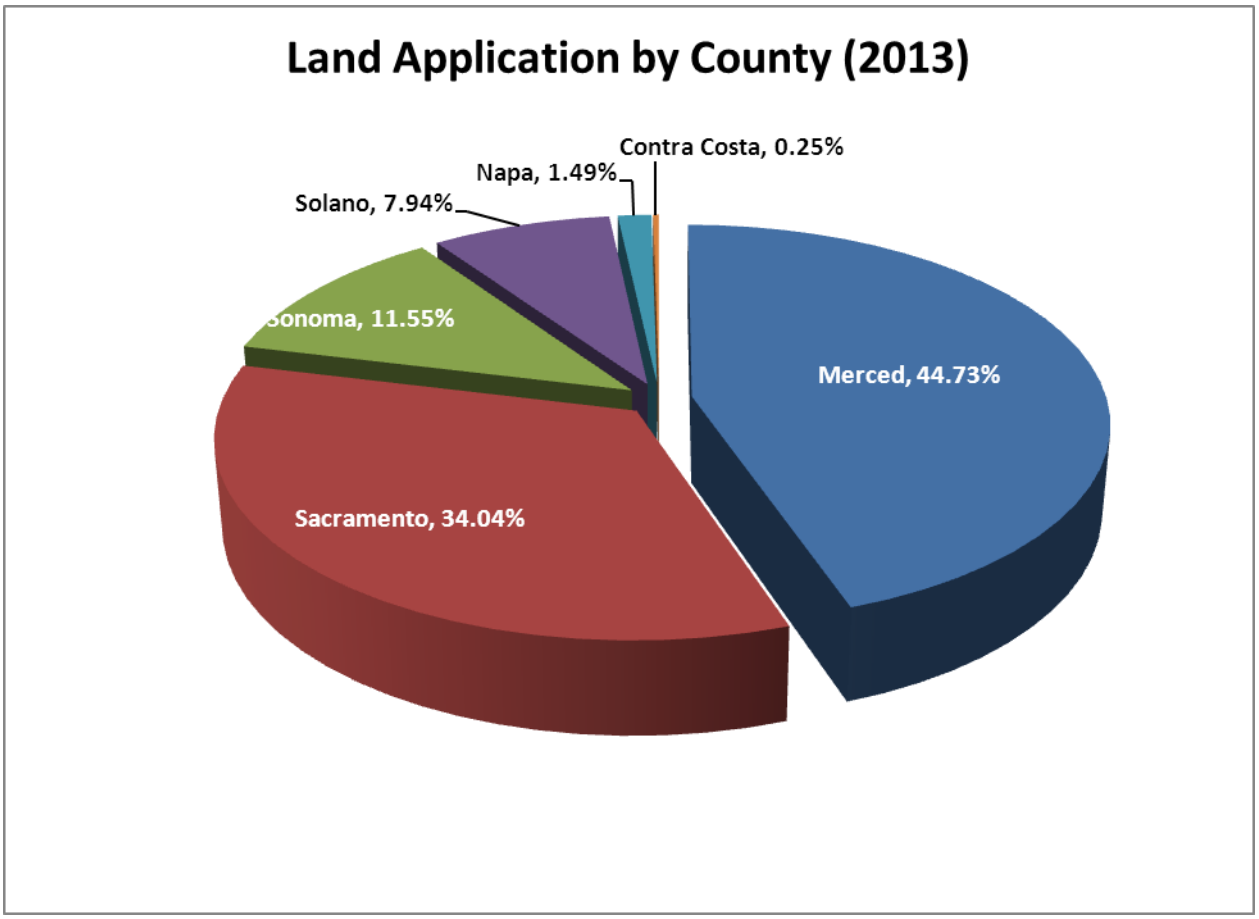

Figure 4. Distribution of Land Application of Biosolids among the Counties. ***(Data Provided By EPA Region 9).***

Bay Area Regional Efforts

BACWA Biosolids Committee. The BACWA Biosolids Committee's (Committee) mission is to support the development and maintenance of cost-effective, sustainable biosolids management options for the more than 150,000 dry metric tons of biosolids produced in the Bay Area annually. The Committee continues to provide proactive support and information sharing to member agencies on regional biosolids issues, projects, and proposed regulations and legislation. The reconstituted committee will emphasize biosolids technology information sharing among the participating agencies by providing facility tours and establishing a forum for vendors to present their products and technologies. By providing this venue for information sharing, the Committee helps evaluate and advance emerging technologies and provides

guidance on best practices in the industry. The Committee recently met at the San Francisco Public Utilities Commission (SFPUC) new headquarters and toured the LEED Platinum certified building focusing on the on-site wastewater treatment system for providing in-building recycled water for toilet flushing.

Bay Area Biosolids to Energy Program. The Bay Area Biosolids to Energy Coalition (BAB2E, Coalition) was formed in 2006 and includes nineteen San Francisco Bay Area agencies representing a total population of over four million people. BAB2E seeks to develop options to implement within the Bay Area that utilize biosolids as a renewable energy resource. Producing energy from biosolids is an emerging field with significant advancements in technology, research and development currently taking place. BAB2E pursues a multi-pronged approach that includes:

- Advocacy for regulations and funding to foster technology solutions and project implementation
- Solicitations to identify ready to implement commercial-scale projects
- Technology incubation to foster technology research and development through facilitating partnerships and hosting demonstration projects

Current coalition members are:

City of Burlingame
City of Livermore
City of Millbrae
City of Palo Alto
City of Richmond
City of San Jose
City of Santa Rosa
Central Marin Sanitation Agency
Delta Diablo Sanitation District
Dublin San Ramon Services District
Fairfield-Suisun Sewer District
Ironhouse Sanitary District
North San Mateo County Sanitation District
San Francisco Public Utilities Commission
Sausalito-Marin City Sanitary District
Silicon Valley Clean Water
Union Sanitary District
Vallejo Sanitation District
West County Wastewater District

Advocacy. Previously BAB2E obtained a $1 million grant through the California Energy Commission for a demonstration project. This year, BAB2E secured language in the House and Senate Energy & Water Appropriations bills directing biosolids feedstock to be included under Department of Energy renewable energy program funding. The Coalition is supporting a recently submitted grant proposal to the California Energy Commission for a commercial-scale project proposed by Synagro/SCFI.

Solicitation for Project Proposals. The Coalition issued a request for proposals in 2013 and is now in discussions with the team of Synagro/SCFI regarding a proposed biosolids to energy facility. SCFI's AquaCritox® technology uses Super Critical Water Oxidation (SCWO), an oxidation process that converts organic materials into carbon dioxide and water. Ideally,

through future solicitations, biosolids to energy options will be developed for implementation throughout the Bay Area, providing valuable locally-distributed energy generation and reducing hauling.

***Technology Development Challenges*.** Commercial-scale demonstration of biosolids to energy requires large capital investment that is difficult to obtain without a revenue stream; yet agencies cannot commit a revenue stream without commercial-scale demonstration. It is expected that initial projects will require state and federal assistance to help offset the higher costs. However, once initial projects are established, costs are expected to come down. BAB2E goals are closely tied to state and federal policy goals of renewable energy development and greenhouse gas reduction; and the state and federal government have an interest and role in addressing this challenge by assisting with the funding gap.

***Technology Research & Demonstration Projects*.** Significant work is taking place to develop technologies that can cleanly and efficiently convert biosolids to usable forms of energy including electricity and transportation fuel. As part of the Coalition's desire to be incubators of technology, within the BAB2E, Coalition agencies are sponsoring three different technology demonstration projects. These demonstration projects are at different stages of design, funding, and testing. BAB2E in also participating in a program called Leaders Innovation Forum for Technology (LIFT) sponsored by the Water Environment Research Foundation (WERF) to foster technology development to meet industry challenges.

Individual Agency Programs

Individual BACWA agencies are responsible for their own biosolids management programs and each develops its own plan in addition to participating in regional programs. Below are program highlights for many of the participating agencies. Note that while Fairfield Suisun Sewer District does not apply biosolids to agricultural land in the County, they are an active participant in both the BACWA Biosolids Committee and the Bay Area Biosolids to Energy Coalition.

All agencies that land applied Class B biosolids in Solano County were either a participant in the Bay Area Biosolids to Energy program, produce Class A biosolids currently (Pacifica) and/or diverted a portion of their biosolids to Class A conversion facility (i.e., compost).

City of Burlingame. The City of Burlingame Wastewater Treatment Facility continues to contract with Synagro to land apply biosolids to farm land in both Sacramento and Solano Counties. During calendar year 2014, a small volume of biosolids was diverted to Merced County for composting at Synagro' s Central Valley Compost facility. The City continues to participate in the Bay Area Biosolids to Energy Coalition

Burlingame land applied approximately 773 wet tons in Solano County in 2014.

City of Calistoga. The City of Calistoga generated approximately 241 dry metric tons of dewatered sludge for land application. This material is prepared according to 40 CFR

regulations. At this facility, solids are processed by the treatment methods of thickening and application to drying beds. Synagro, a residuals management company, is commissioned by the City for transport and disposal of the generated material. Generally, the material is land applied to various fields owned and operated by Synagro in Solano County. About 10% of this material is diverted for alternative technologies to produce Class A Biosolids at the Synagro's Central Valley Compost Site.

Calistoga land applied approximately 876 wet tons in Solano County in 2014.

City of Millbrae: In 2014 the City of Millbrae continued to contract with Synagro to land apply, compost biosolids or use as ADC. The City also continues to participate in the Bay Area Biosolids to Energy Coalition seeking further reuse and disposal options. The City suspended acceptance of trucked-in restaurant grease trap waste (brown grease) for digestion while digester rehabilitation was in progress in 2014. The City expects to resume accepting grease trap waste sometime in early 2015 once the digestion system is completely stabilized.

Millbrae, through Synagro, land applied approximately 396 wet tons in Solano County in 2014.

City of Pacifica - Calera Creek Water Recycling Plant. The City of Pacifica's Calera Creek Water Recycling Plant continues to contract with Synagro to land apply biosolids to farm land in Sacramento and Solano counties. In 2014, Synagro has land applied approximately 334 wet tons or 86.8 dry tons in Solano County. Calera Creek Water Recycling Plant utilizes Autothermal Thermophilic Aerobic Digesters. This type of digester system produces Class A biosolids. All of the biosolids sent to Solano County for 2014 were Class A biosolids.

City of San Mateo. City of San Mateo's digesters are currently providing excellent volatile solids destruction averaging 66.5% for 2014. All of the City's biosolids are beneficially used as either ADC, soil amendment, or composted. Synagro is presently shipping a portion of the biosolids to its Central Valley Compost Facility. The City recently received a grant from the California Energy Commission to clean up and utilize the biogas from the digestion process to produce compressed natural gas (CNG) for the City's vehicle fleet, which will be converted for its use.

San Mateo land applied approximately 1,007 wet tons in Solano County in 2014.

City of Sunnyvale. The City of Sunnyvale produces Class B biosolids both through anaerobic digestion of primary solids and from biosolids derived from oxidation pond maintenance. The former are dewatered, solar dried to approximately 30 to 40% solids, and stockpiled on site. The latter are centrifuged to approximately 20 to 25% solids and stockpiled briefly on site. Both streams are tested to ensure compliance with regulatory standards, and then the material is transferred to beneficial use destinations. Through its contract with Synagro, the City of Sunnyvale land applied approximately 143 wet tons in Solano County in 2014. More than 1,140 wet tons of biosolids were diverted to Merced County for producing a Class A compost material.

Delta Diablo Sanitation District. Delta Diablo is the Lead Agency for the Bay Area Biosolids to Energy Coalition, actively working to develop biosolids to energy technology alternatives for the Bay Area. Delta Diablo recently completed a Fats-Oils-Grease (FOG) receiving facility, which will boost methane gas and energy production from its cogeneration plant. The addition of FOG to the solids treatment process is known to reduce the volume of solids produced through the digestion process. Delta Diablo continues to contract with Synagro for biosolids management. Of the 10,156 tons of biosolids produced by Delta Diablo from November 2013 through October 2014, 98% was land applied and 2% was diverted to Merced County for producing a Class A compost material.

El Dorado Irrigation District (Deer Creek). El Dorado Irrigation District: Deer Creek WWTP contracts with Synagro to land apply Class B biosolids at their Silva Ranch beneficial use site in Sacramento County. For 2014, approximately 25% (1,647 wet tons) of biosolids were transported and beneficially used in Solano County. Approximately 1,365 wet tons were diverted to the Synagro compost facility in Merced County (through the end of October 2014).

North San Mateo County Sanitation District. North San Mateo County Sanitation District (Daly City) continues to contract with Synagro to land apply biosolids to farm land in both Sacramento and Solano Counties. Daly City land applied approximately 1,004 wet tons in Solano County in 2014. More than 650 wet tons of biosolids were diverted to Merced County for producing a Class A compost material. The District continues to actively participate in the Bay Area Biosolids to Energy Coalition. The Sanitation District will be conducting a study to further evaluate available biosolids reuse and disposal options for future planning purposes.

San Francisco Public Utilities Commission (Southeast and Oceanside). The Wastewater Enterprise (WWE) (one of three enterprises of the SFPUC) marked its fifteenth consecutive season of land application of Class B biosolids in Solano County. Inspectors from the WWE make monthly trips up to Solano County to ensure that the contractors are following these local regulations. In addition to Solano County, the WWE also land applies Class B biosolids in Sonoma County. As of June 2011, the WWE entered into a three-year contract (which was extended for one year through May 2015) with Synagro to divert 5,000 and 10,000 wet tons per year to Synagro's Central Valley Compost Facility in Merced County. For the past twelve months (October 2013 - September 2014), the WWE has diverted approximately 6.1% of the total biosolids to this Class A option. During the wet-weather season (October 15 – April 15), the biosolids from both plants are stored in a lined storage area at Hay Road in Dixon landfill for beneficial use at the landfill facility during the next dry-weather season.

Construction commenced on August 2012 for the upgrade of the digestion process at the Oceanside Water Pollution Control Plant (OSP) to a two-stage thermophilic/mesophilic process known as Temperature-Phased Anaerobic Digestion (TPAD) that will generate Class A Biosolids as defined by the 40CFR503 regulations. It is anticipated that construction will be completed by March 2015 and process start-up will commence. Start-up is expected to take at least six to eight months prior to the biosolids from OSP meeting Alternative 1 (time & temperature) classification of Class A. The WWE is proceeding with its multi-billion Sewer System Improvement Program

http://sfwater.org/index.aspx?page=616 that includes as one of the keystone projects a complete reconstruction of the Southeast Water Pollution Control Plant's (SEP) Biosolids processing facility. WWE Staff and its consultant team (Brown & Caldwell, CH2MHIll and Black & Veatch) have decided on Thermal Hydrolysis Pretreatment prior to mesophilic digestion to achieve Class A biosolids from the SEP. The estimated total project cost is nearly $1.2 billion.

The WWE continues to actively participate in the Bay Area Biosolids to Energy Coalition.

Silicon Valley Clean Water. Through the end of October 2014, the Silicon Valley Clean Water (SVCW) land applied approximately 76% of its Class B biosolids in Merced, Solano, and Sacramento Counties via our contract with Synagro. SVCW also diverted approximately 6% of SVCW biosolids to a compost facility in Merced County. In 2014 SVCW diverted approximately 18% to landfill for beneficial use in Solano County. SVCW is participating in the efforts of the Bay Area Biosolids to Energy Coalition to identify and implement other methods of biosolids beneficial use. SBSA is also investigating alternative drying methods and potential uses for biosolids independently, in the event regional efforts do not meet our long-term needs.

In 2014 SVCW sent 947 wet tons for land application in Solano County.

Union Sanitary District. Union Sanitary District (USD) beneficially reused 100% of its biosolids in 2014. USD biosolids quality in 2014 met all USEPA regulations for the 21st consecutive year. USD continues to contract with Synagro for its biosolids management, with nearly 75% of USD's biosolids land-applied to farmland in Sacramento, Merced and Solano Counties. Approximately one-quarter of biosolids production was diverted to Merced County for producing compost, a Class A material.

USD is one of 19 Bay Area wastewater utilities actively participating in the Bay Area Biosolids to Energy . BAB2E is actively pursuing leading edge biosolids to energy technologies, with the goal of generating additional renewable energy from Bay Area biosolids. In late 2014, USD is scheduled to begin operation of a state-of-the-art cogeneration facility, which will increase the amount of renewable energy produced from biosolids from 17% of plant power demand to nearly 70%.

USD land applied approximately 170 wet tons in Solano County in 2014.

Bay Area Clean Water Agencies appreciate the opportunity to present this report for your consideration and will work with staff to address any questions you may have regarding the above information.