
Chapter 8

Biosolids Program

Biosolids are the nutrient-rich organic material produced by treating wastewater solids. After they are processed and treated, biosolids can be beneficially reused as a fertilizer and soil amendment. RWSP biosolids policies guide King County to continue to produce and market Class B biosolids and to evaluate alternative technologies to produce the highest quality marketable biosolids, including Class A biosolids.^{1,2} In addition, the policies call for the county to use methane, also produced during solids processing at the treatment plants, for energy and other purposes where cost-effective.

This chapter describes the county's Biosolids Program accomplishments in 2007 and its planned activities for 2008.

8.1 Accomplishments in 2007

8.1.1 Use of Biosolids

The Wastewater Treatment Division (WTD) continued to produce high quality Class B biosolids at the South and West Point Treatment Plants. Approximately 108,000 wet tons of biosolids were produced in 2007, all of which was recycled as a soil amendment for forestry and agricultural applications and to make compost. The sale of biosolids generated \$86,300 in revenue. Monitoring continues to show low levels of pollutants and excellent nutrient value of biosolids.

In 2007, King County's biosolids were used as a soil amendment for a variety of applications:

- 3,900 acres of wheat in Douglas County
- 314 acres of canola, 534 acres of hops, and 126 acres of timothy grass (hay) in the Yakima Valley
- 354 acres of state forestlands and 1,162 acres of Douglas-fir plantations in Hancock's Snoqualmie Forest as part of the Mountains to Sound Greenway Biosolids Forestry Program

¹ Class B biosolids refer to biosolids that have been treated to significantly reduce pathogens to levels that are safe for beneficial use in land application.

² Class A biosolids refer to biosolids that have been treated to reduce pathogens to below detectable levels. Biosolids that meet this designation can be used without site access or crop harvest restrictions and are exempt from site-specific permits. Federal regulations require Class A level of quality for biosolids that are sold or given away in a bag or other container or that are applied to lawns or home gardens.

8.1.2 Meeting Permit Requirements

In June 2007, the Washington State Department of Ecology (Ecology) issued amendments to Chapter 173-308 WAC, the 1998 state rule for biosolids management. The purpose of the amendments is to improve the permit process, allow for better septage management, adjust the biosolids permit fee structure, incorporate policy changes, and address “general housekeeping” issues.

The effects of some of the amendments on WTD’s program are as follows:

- The amendments now require all agencies and septage management facilities to pay permit fees. (Only certain types and sizes of operations were required to pay before the amendments.) The greater number of payers and implementation of a new permit fee structure are increasing the funds available to Ecology for overseeing the state biosolids program. Under the new fee structure, King County’s annual permit fee has decreased by nearly \$19,000.
- The amendments require submittal of a spill prevention and response plan for transporting biosolids. WTD has had such a plan in effect for many years, and this plan is consistent with the amendments.
- The amendments include a requirement, which became effective June 24, 2007, to “significantly remove manufactured inerts,” such as plastics, metals, ceramics, and other manufactured items that remain relatively unchanged during the wastewater treatment process. Meeting this requirement can be achieved by a barscreen with a maximum aperture of 3/8 inch. WTD is undertaking a project to upgrade its influent barscreens at West Point and expects to advertise for consultant design services in late 2008. Facilities must comply with the requirement by July 1, 2012.

8.1.3 Environmental Management System Certification

In 2004, the county’s Biosolids Program passed an independent audit and was certified into a national program of Environmental Management Systems (EMS). The EMS program was developed by the National Biosolids Partnership (NBP) to support continual improvement and enhance environmental performance of biosolids programs. In 2007, NBP awarded the Platinum Level designation to WTD’s Biosolids Program. The Platinum Level designation represents the highest achievement of biosolids management and environmental stewardship.

In 2007, WTD evaluated the EMS program designed by NBP against the International Standards Organization’s EMS, known as ISO 14001. The evaluation determined that ISO 14001 methods would be comparable but less expensive to implement than NBP methods. ISO 14001 is also a more nationally recognized standard.

WTD will change from the NBP EMS to ISO 14001. WTD expects to complete planning and implementation for the ISO 14001 transition for its solids treatment and biosolids activities and for the overall WTD program in 2008 and to become certified in 2009. In 2009, WTD will begin to expand the program to all WTD activities.

8.1.4 Producing Energy from Methane

Digester gas is energy-rich methane gas naturally produced during solids treatment by microorganisms degrading solid organic matter. The West Point and South plants recover digester gas to generate heat, electricity, and natural gas; design is under way for a facility at the Brightwater plant for testing new technologies that generate energy from digester gas.

At West Point, digester gas is used to run boilers that provide heat for plant processes and buildings. The gas is also fed to internal combustion engines that provide power to run the raw sewage pumps. In 1984, West Point began using digester gas to power cogeneration engines that produce power and heat. The engines had reached the end of their useful life in 2007 and were removed from the plant site. WTD staff assessed alternatives for a new cogeneration facility and recommended implementation of a plan to install two new internal combustion engines capable of supplying up to 4.6 megawatts of power. WTD is coordinating with Seattle City Light, which serves West Point, and the U.S. Environmental Protection Agency (EPA), which is expected to fund part of construction of the project. Final design is under way. The goal is to have a new cogeneration facility online by 2012.

At South plant, digester gas is used to run a boiler that provides heat for plant processes and buildings. The remainder of the gas is “scrubbed” and sold to the local natural gas utility. During months of high energy use, a turbine cogeneration system (two gas turbines and one steam turbine) may be used to generate supplemental heat and electricity and reduce peak load utility charges for the plant. The gas turbines run on scrubbed digester gas; the steam turbine runs on heat recovered from the gas turbines.

In 2004–2006, digester gas was used to fuel a 1-megawatt molten carbonate fuel cell at South plant during a successful two-year demonstration project of the new technology.³ Fuel cells are electrochemical devices that convert chemical energy from fuels containing hydrogen directly to electricity and heat. The demonstration project was conducted in cooperation with EPA and FuelCell Energy, Inc. The final report is expected to be complete in 2008 and will serve as a resource for other agencies considering fuel cell stationary power plants as a means to beneficially use digester gas. The fuel cell is currently not in use because it needs significant repairs. WTD is considering repairing it or moving to a smaller portable version that incorporates improvements based on demonstration project results. For more information on the fuel cell demonstration project, visit the project’s Web site at <http://dnr.metrokc.gov/wtd/fuelcell/index.htm>.

Some of the digester gas produced at the Brightwater Treatment Plant when it comes online will be used to run a boiler that generates heat for the digestion process and buildings. In 2007, WTD completed a study to explore the feasibility of technologies that could use the surplus digester gas to generate alternative forms of energy at the plant site. The study includes estimates of capital and operating costs for a new Energy Technology Demonstration Facility (ETDF). The ETDF will interconnect with digester gas sources and treatment plant utilities to provide a versatile platform for researchers and manufacturers in the Northwest to beta test a variety of

³ Natural gas (both scrubbed digester gas and gas supplied by the local utility) was used to power the fuel cell power plant at times when plant and digester gas supply systems were being adjusted.

near or commercially ready equipment. Devices being tested will be displayed to students and the general public. Siting of the ETDF was incorporated into the design of Brightwater. Design of the ETDF is expected to be complete in 2008. Friends of the Hidden River, a non-profit organization, worked with King County to develop broad support for the project and secured funding for the feasibility study and ETDF design through a series of Washington State Department of Community, Trade and Economic Development grants. Funding for construction and long-term operation is being sought from a mix of private and public sources.

For more information on WTD's energy recovery efforts, visit the program Web site at <http://dnr.metrokc.gov/wtd/energy/>.

8.1.5 WTD Energy Plan

In 2007, WTD began work on an energy plan specific to wastewater treatment operations. The plan will develop criteria for determining where to focus energy efficiency efforts. Teams comprised of staff at both West Point and South Treatment Plants meet regularly to identify, prioritize, and follow through with energy-related efforts. A draft energy plan is scheduled to be complete in 2008. The King County Executive's *King County Energy Plan*, drafted in 2007, contains two specific goals for WTD: (1) by 2012, achieve a 10 percent reduction in energy use, based on the amount of water treated, and (2) 50 percent of WTD's energy use must come from renewable sources by 2012.

8.1.6 Cooperative Research

In 2007, WTD continued biosolids-related research and demonstration in cooperation with the Northwest Biosolids Management Association (NBMA) and scientists from the University of Washington (UW), Washington State University, and the University of Arizona. UW led a study during the year on the fate and degradation of endocrine-disrupting compounds in land-applied biosolids. The researchers evaluated nonylphenol, a product of common household detergents, and concluded that it degrades quickly in the soil environment. Research that focuses on the environmental effects of biosolids and on carbon sequestration opportunities will continue with NBMA and university researchers in 2008.

8.1.7 Awards

The Society for Technical Communication awarded WTD an Excellence Award for the *Biosolids, the Ultimate in Recycling*, poster (Figure 8-1). STC is a membership organization dedicated to advancing the arts and sciences of technical communication. It is the largest organization of its type in the world. The poster was developed for use as an educational tool for teachers, students, and adults who tour WTD treatment plants. WTD Biosolids Program staff developed the poster in cooperation with the GIS, Visual Communications, and Web Unit of the Department of Natural Resources and Parks.



Figure 8-1. Biosolids, the Ultimate in Recycling, Poster

8.2 Schedule for 2008

The following Biosolids Program activities are planned for 2008:

- Issue a request for information (RFI) to learn of market options available for supplementing, strengthening, or diversifying its Biosolids Program and to learn of reliable, cost-effective, publicly acceptable, and environmentally beneficial biosolids management options that can be implemented in the next decade.
- Continue to conduct cooperative research and demonstration projects to evaluate the safety and benefits of the county’s biosolids projects, including evaluating new uses that provide additional environmental benefits, and to respond to public concerns or questions.
- Complete Phase 1 of the transition to ISO 14001 EMS. Phase 1 consists of preparing an EMS manual for WTD and the documents necessary for implementing the EMS for solids treatment and biosolids.
- Advertise for consultant design services to upgrade influent screens at West Point.
- Complete a draft energy plan.
- Complete the report for the South plant fuel cell demonstration project.

- Prepare for an independent audit in 2009.

Visit the Biosolids Program Web site for more information:

<http://dnr.metrokc.gov/wtd/biosolids/>.