Virginia Pollution Prevention Case Study
Prince William County – Solid Waste Division

Facility Information

The Prince William County (PWC) Solid Waste Division (SWD) is a local government entity in Woodbridge that provides solid waste management to over 400,000 residents of the County. The SWD is made up of 58 employees and is part of the Public Works Department within the county. SWD manages two facilities, a 1,000 acre Sanitary Landfill (Landfill) and a 30 acre Balls Ford Road (BFR) Composting Facility. The Landfill receives approximately 900 tons of refuse per day.

In addition to solid waste management the SWD provides recycling and composting services as well as educational opportunities. The division is funded through a Solid Waste Fee that is charged to all properties in the County as a separate line item on the real estate property taxes. The SWD sustainability program began in 2003 to formalize the County's commitment to environmental sustainability through implementation of an Environmental Management System (EMS) and participation in the Virginia Environmental Excellence Program (VEEP). The Landfill and the BFR Composting Facility are functional and fascinating facilities that have become destinations for bird-watchers, school science classes, business groups, professional organizations, and other members of the community.

Environmental Challenges and Opportunities

The Prince William County executive staff saw an opportunity to go above and beyond regulatory compliance and decided to pursue this goal through implementation of an EMS. From the beginning of the implementation phase there was buy-in from the top of the organization that spread through the rest of the County's staff. The County wanted to reduce environmental impacts and make it a program that was visible to all of the citizens of Prince William County.

The biggest challenge was building a program from scratch. When the EMS was implemented there was no existing structure to build from or current environmental plans in place. Every part of the program was new and required changing the routines and standard operations to something that would benefit the environment and save the taxpayers money.

Implementation of the Program

Greening the Mission

The Department of Public Works is responsible for the effective and efficient management of the trash and recycled materials generated in the community. Each member of the staff works diligently to reduce the amount of waste disposed at the Landfill and BFR Composting Facility; safely handle and dispose of hazardous materials; operate a safe and environmentally friendly Landfill; and find economical and practical ways to manage trash. Their mission is to make a

meaningful contribution to improve the quality of life for their residents, and to protect and preserve the natural environment.

Both the Landfill and the BFR Composting Facility offer extensive recycling programs for paper products, food, and beverage containers, as well as for special waste streams such as oil, anti-freeze, and batteries. In addition, both sites offer reuse programs for clothing, shoes, and textiles. PWC has reduced solid waste disposal by 36,430 tons per year, saving over $2 million in disposal fees. The facilities also recycle petroleum based products, including plastic and over 1,800 tons of tires, which are shredded and used for daily cover at the Landfill. The BFR Composting Facility piloted a successful food waste program with the Virginia Department of Environmental Quality (DEQ) to accept pre-consumer fruit and vegetable waste. In the first year and a half of the program, over 1,600 tons of food waste was converted to useable compost. Through a waste exchange program, the BFR Composting Facility accepts on average 30,000 tons of yard waste from Fairfax County.

SWD is always looking for innovative ways to reduce the amount of waste going into the Landfill and has implemented numerous programs to support this goal. The Household Hazardous Waste and Electronics Recycling program allows residents to recycle or properly dispose of paint, chemicals, fuel, fluorescent lamps, appliances, computers, and other electronic devices at no additional cost. Some of the paint from these collections is provided to the county graffiti removal team for community projects. PWC has reduced hazardous waste disposal in the landfill by 831 tons since 1991 saving $76,923 in disposal fees. PWC has also implemented a "Donation Place" program in order to provide citizens a means to donate furniture, construction materials, and other items that could be reused. To encourage recycling even further, the SWD provides recycling drop-off trailers at 16 easily accessible locations throughout the county.

PWC achieved a recycling rate of 41.3 percent in 2012, up from their 2011 rate of 40.7 percent and well above their 25 percent mandatory minimum set by the Commonwealth of Virginia.

Finding Ways to Reduce and Prevent Pollution

SWD has reduced air emissions by 230 tons PM30, 9,850 tons CO^2, and 1,897 lbs SO^2. SWD has also been finding new ways to use landfill gas. An active gas extraction system has been in place since 1998. The landfill power plant was expanded in November 2013 and is now producing 6.7 megawatts of power, enough to meet the average electric needs of approximately 5,000 homes. In 2009 they initiated a plan to replace propane gas with renewable landfill gas at several County facilities located near the Landfill. By 2011, landfill gas was being used to heat nearby PWC Fleet facilities and power the incinerator at the PWC Animal Control facility. This unique use of landfill gas is saving these PWC facilities over 40 percent in fuel costs while reducing the consumption of fossil fuels.

SWD has incorporated numerous efforts to address water usage as well as runoff at their facilities. For example, water from the heavy truck wheel wash station is collected for reuse in order to conserve water. A pipe gutter system was installed to slow and control runoff from the landfill slopes, along with rip rap ditches and gabion baskets to reduce runoff and redirect flow away from problem areas, which are the non-capped areas. Temporary berms have been used at

the top of the landfill slopes for predicted weather events to slow the water flow and prevent channeling. SWD performs groundwater monitoring on 22 wells in addition to quarterly surface water testing.

SWD road vehicles have been outfitted with GPS devices in order to reduce idling time and speed to achieve optimum fuel mileage. Transportation efficiency planning reduced the number of trips between the Landfill and the BFR facility, saving over 13,700 miles of vehicle usage per year, equaling 15.2 metric tons of CO^2.

Partnerships and Community Involvement

The SWD has partnered with the community in multiple ways in order to create and maintain healthy ecosystems. These community partnership activities have included installation of Kestrel nesting boxes, vernal pools, snake boards, as well as monitoring and maintaining a Lady Slipper orchid habitat in the landfill buffer area. These projects have been done within the landfill's 1,000 acres, since only 250 acres of the site are currently permitted as landfill areas. Thru the efforts of community groups, the SWD's 350 acre "buffer zone" was designated by the Audubon Society as an "At Home Wildlife Sanctuary" in 2012. Thus far, 300 acres of natural resources have been restored and plans have also been developed for the construction of an eco-park at the landfill to provide educational opportunities and showcase alternative renewable energy options and new waste conversion technologies.

SWD makes every effort to keep the community informed and hosts a Landfill Open House on "PWC Recycles Day" that highlights their capabilities and promotes recycling and composting activities. They also created a video tour of the Landfill which regularly plays on the local government television channel and provides viewers with an overview of SWD services and facilities. In order to further support the community, SWD has converted a closed area at the front of the Landfill facility to a multi-purpose field for sports and other activities. Getting the message of sustainability out to the community and beyond has become a part of SWD's regular operations. Staff are regularly asked to share their knowledge with others at speaking engagements for schools, community groups and professional organizations.

The Solid Waste Citizens Advisory Group, appointed by the Board of County Supervisors, is an active partner with SWD, and meets monthly to discuss landfill and solid waste issues and ways to promote sustainability. Partnerships with the Virginia Cooperative Extension, home school groups, Master Gardeners, 4-H, and Boy Scouts have also been critical to the sustainability program, with many activities focusing on habitat development and maintenance. One unique and successful program is the annual "Big Night", where area students gather to perform a spotted salamander species count near the Landfill's vernal pools located in the buffer areas. The "Big Night" is when the spotted salamanders migrate to the vernal pools to lay and fertilize eggs.

Waste haulers are another important stakeholder, and SWD has quarterly meetings with them to share facility updates, discuss plans, and provide the haulers an opportunity to voice their concerns or make suggestions. For example, an in-depth load inspections program has successfully reduced the amount of unauthorized waste, due in part to the haulers having a clear understanding of the importance of the program and the consequences of violating the policies.

Mentoring and Recognition

The sustainability program has led to increased compliance through regulatory reviews as well as increased staff training on requirements and best practices. It has also created a strong relationship between PWC and regulatory agencies. SWD has made an effort to support other facilities in their pursuit of environmentally sustainable practices by using their experiences to mentor facilities within the County and throughout the state that are seeking overall program improvement.

The SWD has been recognized for their environmental achievements on numerous occasions. In 2011, the Landfill and BFR facilities achieved the Extraordinary Environmental Enterprise (E4) level of the Virginia Environmental Excellence Program. In 2012, the SWD won the Solid Waste Association of North America's (SWANA) Award for Landfill Gas Utilization. In 2013, they won a Governor's Environmental Excellence Gold Medal Award for Sustainability. In 2014 APWA Project of the Year- Environmental Category.

Evaluation of the Process

Having upper management's support from the beginning made implementation of the program easier. In addition to management support and a strong working relationship with regulatory bodies, community stakeholder involvement and pride in the facilities has been the key to the program's success. The focus on sustainability has helped the County develop the Landfill and BFR into sites that the community is proud of. Instead of being an eyesore or public nuisance, the facilities are destination sites for school groups, nature lovers, environmentalists, and other interested community members. The facilities provide tours for over 1,600 people a year. The community displayed confidence in the SWD commitment to protect water supplies, minimize odors and pests, and protect air quality by approving construction of a new high school on property directly adjacent to the Landfill.

An added benefit of the program is that it has significantly extended the life of the Landfill. As the sustainability program has expanded over the years, County residents have been given the opportunity to recycle and compost more materials than ever before. These efforts, along with the educational outreach and community involvement, have resulted in County residents and businesses significantly reducing the amount of waste entering the Landfill by about 320,000 tons per year, prolonging its useful life to 2065 and beyond.

The success of the SWD sustainability program is due in large part to stakeholder involvement including facility staff, waste haulers, neighbors, educational groups, and the general public. Facility staff receives extensive training and have a clear understanding of their role in providing safe and sustainable services for the community. The EMS is reinforced on a continuous basis in the workplace. The SWD staff takes pride in the fact that their suggestions have provided many of the successful environmental initiatives that have been successfully implemented. They share their knowledge with the community through educational outreach including facility tours for the chamber of commerce, school groups, senior centers, and professional organizations.

The implementation of the program could have benefited from a mentor company or organization that had been through the process before. The paperwork involved with developing the EMS was intimidating in the beginning, and having a mentor would have made the process go more smoothly. Because PWC was committed to implementing the program they were able to overcome this early hurdle, but companies and organizations may want to seek out similar entities that have successfully implemented an EMS to guide them through the questions that they may have and learn from their mistakes and successes. SWD is hoping to mentor other departments in the County about the benefits of an EMS.

Continual Improvement of the Program

Continual improvement is important to SWD and they are currently in the early stages of planning two exciting projects. First, the County is seeking to host an organic waste management project using an innovated conversion technology to produce renewable energy at the BFR facility. Secondly, the County is planning an Eco-park complex that will be located at the Landfill. The Eco-park goal is to include Renewable Energy, Environment, and Education as the major components. In addition to the Landfill gas utilization currently in place, SWD is planning on installing solar panels on closed areas of the Landfill. The County is also in the early stages of preparing to host a demonstration project of an innovative municipal solid waste (MSW) conversion technology at the Landfill. They are looking for technologies on the verge of commercialization and that need to be proven at throughputs of 50 to 200 tons per day (TPD) on a continuous basis. Examples of this type of technology include pyrolysis, gasification, anaerobic digestion, plasma torch or other conversion methods producing a fuel or energy product, such as electricity, syngas, synfuel, steam, useable heat and/or other commercial energy outputs. This project has many benefits, such as proving/testing new technology for the future, extending the life of the Landfill, increasing recycling, and converting solid waste into reusable products. There are risks associated if the project fails, but the County believes that the benefits outweigh the risks for this project, and continuing to find ways to divert waste from the landfill will provide benefits for future generations.