2012 LANDFILL RE-USE EXCELLENCE AWARD
CHECKLIST AND RELEASE

2012 Applications must be submitted to SWANA no later than Friday, April 13, 2012

*** PLEASE NOTE THAT ENTRY REQUIREMENTS HAVE CHANGED ***

Application Checklist (Please make sure the following items are included in your submittal packet)

- Completed release statement (this page), to be scanned and included in digital submission
- Check (made payable to SWANA) or credit card payment for nomination fee (in U.S. dollars) via Excellence Award Nominations
- At least 2 pictures of your operation (may be included in nomination text)
- One copy of your award submittal uploaded using your purchased 2012 SWANA Excellence Awards Application Uploading Instructions
- If you would like to mail your submission, please contact Jesse Maxwell, Program Coordinator, at jmaxwell@swana.org or (240) 494-2237.

Release Statement: I certify that the information provided in this application is accurate and correct to the best of my knowledge. SWANA reserves the right to publish the enclosed information. Nominations become the property of SWANA. My signature gives SWANA the right to reprint or make available for purchase any portion of this submittal.

Signature: [Signature] Date: 4/12/12
LANCASTER COUNTY SOLID WASTE MANAGEMENT AUTHORITY
SWANA 2012 EXCELLENCE AWARD NOMINATION | LANDFILL RE-USE CATEGORY
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Turkey Point Renewable Energy Park

The Lancaster County Solid Waste Management Authority (LCSWMA), in partnership with PPL Renewable Energy and Turkey Hill Dairy, developed the Turkey Point Renewable Energy Park located on its Frey Farm Landfill (FFLF) property in Lancaster County, Pennsylvania. This innovative venture, exemplifying sustainable renewable energy initiatives and opportunities for local economic growth, includes:

- **Landfill Gas Plant**, 3.2MW project that captures methane gas to create electricity for local homes and businesses, plus provides steam to neighboring Turkey Hill Dairy, a manufacturer of drinks and ice cream;

- **Wind Project At Turkey Point**, 3.2MW project (two 1.6MW GE turbines) that provide approximately 25% of Turkey Hill Dairy’s annual electric needs (enough to make 6 million gallons of ice cream);

- **Rieber House Welcome Center**, an 18th-century farmhouse that has been preserved and restored into an educational and professional meeting space;

- **Energy Pavilion** with an interactive, solar powered touch screen display that offers information on the renewable energy technologies at the FFLF.

Components of the park are located on non-operational portions of the FFLF site. The Turkey Point Renewable Energy Park exemplifies a unique approach to landfill re-use, as well as epitomizes innovation and excellence in the solid waste management industry.
Frey Farm Landfill Overview

The Lancaster County Solid Waste Management Authority (LCSWMA) manages over 640,000 tons of waste each year. Crediting Lancaster County’s Integrated System, only a fraction of that volume enters the Frey Farm Landfill (FFLF). The Integrated System includes: a 1) Transfer Station, permitted to handle up to 2,200 tons per day; a 2) permanent drive-through Household Hazardous Waste Facility; a 3) comprehensive, Countywide Recycling Program; a 4) mass burn Waste-to-Energy Facility, permitted to handle up to 1,200 tons per day; and 5) the Frey Farm Landfill, with a max processing of 2,000 tons of waste per day.

With the closure of Lancaster County’s Creswell Landfill in the late 1980’s, combined with the subsequent need for a new landfill facility, LCSWMA utilized the best available technology in environmental protection when constructing the FFLF. Construction of the first cell of the landfill, and its accompanying leachate treatment plant, began in June 1988 and was completed in just over a year. LCSWMA filled the first 18-acre cell to capacity within 16 months. Construction on the 12-acre second cell took place in 1990. The third cell (built in 1992), fourth cell (built in 1999), fifth cell (built in 2003) and sixth cell (built in 2010) have been used for wastes that are not processed at the Waste-to-Energy (WTE) Facility. With 93 total acres available for waste disposal, the FFLF is expected to last until approximately 2019.

Future planning for the landfill includes vertical expansion of the current site using mechanically stabilized earthen (MSE) walls. Employing this new technology will add several years of additional landfill capacity to continue serving the Lancaster community.
ENVIRONMENTAL CONTROLS
Protecting the Environment

LCSWMA’s primary mission is protecting the environment. Consequently, the FFLF is a double-composite lined facility designed to protect the surrounding ecosystem. The top, or primary, liner is a composite section with 60-mil high-density polyethylene (HDPE) and a bentonite sub-liner. The bottom, or secondary, liner is made of a layer of clay and an additional 60-mil HDPE liner. Above the primary liner is a highly permeable leachate collection zone and between the primary and secondary liners is a highly permeable leachate detection zone, designed to transport leachate to a series of pipes for transport to the final leachate treatment facility.

In 1999, LCSWMA began placement of a portion of the final cap and cover system that will eventually cover the entire FFLF when it reaches capacity. Capping activities include final grading to shape the landfill to promote storm water management and facilitate placement of gas collection wells. The cap itself includes various layers, from top down: approximately 6" of vegetated soil cover; 18" of soil, fabric/net/fabric composite; liner; fabric/net/fabric composite and additional soils. The intent of the capping system is to seal the landfill and reduce leachate generation. The capping system is designed to be as impermeable to rainfall as the liner system is to leachate. In 2004 an eight-acre capping project was completed and in 2010 an 11-acre capping project was completed, bringing the total number of capped acres to 50. Eventually, all 93 acres of the FFLF will be capped.
Leachate Collection & Treatment

The network of pipes in the landfill cells provide gravity flow for leachate to a perimeter pipe which transmits all flow to the lowest portion of the landfill. The primary system empties into a pump station for subsequent leachate treatment, while the secondary system empties into a cell-specific manhole used to detect and monitor any flows within the sub-cell, prior to pumping it into the primary collection system.

Under an inter-municipal agreement, LCSWMA pumps leachate via a pipeline to a local, publicly-owned wastewater treatment plant. The pipeline consists of two pipes; one is nested inside the other and both are constructed of HDPE. This type of pipeline provides the highest degree of environmental protection.

“LCSWMA’s primary concern is protecting the environment.”
Surface water drainage facilities and sedimentation ponds serve the entire landfill site. The National Pollutant Discharge Elimination System permit issued for these controls require annual sampling. Additionally, LCSWMA monitors groundwater each quarter in 33 strategically placed locations (either wells or surface monitoring points). There are 20 locations at the FFLF and 13 at the inactive Creswell Landfill. Landfill gases are also monitored quarterly at points around the site. A gas collection system, installed at both landfills, captures landfill gas and transports it to engines which combust it to create electricity.

In 2003, LCSWMA initiated an additional environmental monitoring system at the FFLF, as required by the Department of Environmental Protection (DEP). All incoming waste vehicles are screened as they approach the inbound scales for radioactivity (from either natural or man-made sources). If the monitors detect unacceptable levels of radioactive materials, LCSWMA’s staff responds in accordance with a Radioactivity Monitoring Action Plan approved by the DEP. The responses include various contingencies such as rejection of the entire load, disposal of the wastes and isolation and determination of the specific material causing the alarm.

“Landfill gases are monitored quarterly at points around the site.”
Operation & Response

The FFLF typifies the most up-to-date design in standards of environmental protection. LCSMWA’s commitment to state-of-the-art facilities includes both design and operation. A testament to this commitment is the compliance history, recorded by the Pennsylvania Department of Environmental Protection (PADEP). In 15 years, the FFLF has yet to receive one notice of violation and is the only landfill in the state to achieve this level of excellence. The FFLF operates five and a half days a week and follows an in-depth Preparedness, Prevention and Contingency Plan for environmental and operational safety.

“The Frey Farm Landfill has a perfect record of environmental performance.”
DESIGN & CONSTRUCTION
The FFLF site possesses unique geographical and topographical characteristics; and as such, LCSWMA looked for opportunities to diversify its business and support local economic development. LCSWMA recognized the potential for partnerships in green initiatives. With the fundamental purpose of serving the community, LCSWMA desired an occasion to incorporate public education as an additional component. Thus, an innovative idea was born...create a renewable energy park that combines green power with sustainable business practices and public education. In partnership with PPL Renewable Energy (PPLRE) and Turkey Hill Dairy, LCSWMA began the arduous process of establishing the Turkey Point Renewable Energy Park on its Frey Farm Landfill site.

“This initiative embodies green energy, sustainable business and public education.”
Landfill Gas Plant

In partnership with PPLRE, LCSWMA developed a Landfill Gas (LFG) Plant that converts methane gas from its closed Creswell Landfill and active FFLF to generate renewable energy. The inactive Creswell Landfill, adjacent to the FFLF that closed in the late 1980's, contains a gas collection system with 53 wells placed throughout the site. The active FFLF contains a gas collection system with 45 wells throughout the site, with another 75 wells planned as the final cell cap is placed.

Landfill gas is generated during the natural process of bacterial decomposition of organic material contained in landfills, and is composed of about 50% methane and 50% carbon dioxide/water vapor. The gas is collected through a series of pipes. Major particulates and water are removed to create clean gas. The clean gas is piped to two Caterpillar 3520 engines contained inside sound attenuated enclosures where 3,200 kilowatts of power is generated. When the engines are down for any reason, gas is burned in an enclosed flare to assure destruction of the gas. Power generated by the two engines is transformed to a higher voltage and sent to the power grid through utility lines located near the plant. Steam is also produced as a by-product of the landfill gas combustion and is piped to a neighboring manufacturing facility, Turkey Hill Dairy, where it offsets more than 140,000 gallons of diesel fuel annually. The steam is used by Turkey Hill Dairy to power their commercial boilers for its manufacturing processes.

The environmental benefits of the LFG Plant are significant. By installing the LFG plant that equates to planting 48,000 acres of forest per year, removing 45,000 cars from the road, offsetting 800 railroad cars of coal, or 400,000 barrels of oil. The economic benefits are remarkable as well. The LFG Plant promotes local economic growth, lower energy costs and develops a domestic, renewable source of energy.
Wind Project At Turkey Point

After successfully completing the LFG project in 2005, LCSWMA and PPLRE entered into a Memorandum of Understanding in August 2006. LCSWMA and PPLRE’s desired to cooperate and share equally in the evaluation and possible creation of future renewable energy projects. As such, the partners began exploring additional renewable energy opportunities at the site and decided that wind energy was the logical next step given the unique geographic features of the landfill on Turkey Point, overlooking the Susquehanna River.

LCSWMA and PPLRE conducted a wind assessment at the FFLF in June 2007. After a 60-meter meteorological tower was installed, a wind resource assessment was conducted over an eighteen month period to evaluate the feasibility of micro-siting two 1.6 megawatt wind turbines at the FFLF to provide energy to neighboring Turkey Hill Dairy. Through this effort, a long-term wind speed of approximately 14.7 mph for a 100-meter hub height was established and it was determined that a shear exponent value of 0.320 was representative of the site. Since the viability of the project weighed heavily upon establishing an accurate shear value, LCSWMA and PPLRE requested a follow-up Sonic Detection and Ranging (SODAR) study, which confirmed the validity of shear value measured by the 60-meter meteorological tower. With this data, the project partners were able to conclude that a wind project was economically viable at the FFLF.

Once the viability of the wind project was confirmed, the project partners moved forward by securing funding for the project, including $4 million dollars in government grants and tax credits. The partners also entered into a Cooperative Agreement with the Pennsylvania Game Commission to protect the welfare of the local avian population. Two 1.6 megawatt General Electric wind turbines were delivered to the site and erected in September 2010 over a two-week period. Both turbines are in place and have been operational since January 2011.

This project provides Turkey Hill Dairy with 7.7 million kWh of energy or 25% of their annual electric needs.
Thanks to a successful installation of the LFG Plant and Turkey Point Wind Project, LCSWMA began planning for the next component of the Turkey Point Renewable Energy Park—a welcome center for visitors and meeting space for public gatherings.

In 2010, LCSWMA completed renovations to the Rieber House Welcome Center, an historic farmhouse located on the landfill site; as well as constructed an Energy Pavilion that houses an interactive LCD Renewable Energy Display. The Rieber House, first constructed in 1770, possesses both architectural and historical meaning in Lancaster County and LCSWMA felt it offered the perfect setting to serve as a welcome center for visitors. Considering its previous dilapidated state, renovating the structure was another way LCSWMA could give back to the Lancaster community.

On the same grounds as the Rieber House Welcome Center lies the Energy Pavilion, which offers visitors a unique opportunity to learn about the various renewable energy technologies operating at the FFLF through an interactive LCD Renewable Energy Display that is powered by solar energy. Open to the public, the Energy Pavilion provides a destination for individuals and small groups to visit for picnics and learn about LCSWMA’s progressive approach to waste management and renewable energy projects. With the addition of the Rieber House Welcome Center and Energy Pavilion, the Turkey Point Renewable Energy Park has truly become a tour destination for local residents and visitors.

“**The Turkey Point Renewable Energy Park has become a tour destination for local residents and visitors.**”
IMPLEMENTATION OF SUSTAINABILITY
Renewable energy, in particular wind energy and solar energy projects, has potential for expansion in Lancaster County and the Commonwealth of Pennsylvania as a whole. While commercial-scale wind projects can be more difficult to site than other renewable energy technologies due to the need for minimum average wind speeds, ample opportunities remain for exploration of this technology in other areas and even more so, for exploration of smaller residential projects. Encouraging the diversification of local energy production is an important component of infrastructure planning, and it offers businesses and residents the opportunity to customize an energy plan to meet their needs by maximizing the beneficial use of renewable resources at a given location.

LCSWMA hosts a variety of educational information about its renewable energy projects online, so that it can be easily accessed by the public. The Turkey Point Renewable Energy Park offers Lancaster County residents a unique opportunity to learn about the important green energy initiatives that are being developed in their community.

Installation of additional renewable energy technologies in Lancaster County will allow the county to grow progressively by ensuring that the infrastructure required to support new growth is in place. It will also entice new growth into the county by demonstrating Lancaster’s unique ability to preserve its rich cultural heritage while simultaneously embracing and promoting the advancement of modern energy technologies. Citizens long for the retention of heritage resources that help to define their region and instill a unique sense of place within their communities. However, this desire for preservation does not preclude the public’s demand for sustainable modern solutions to meet critical needs such as energy, air quality and economic prosperity.
Sustainable Green Technologies (continued)

Through initiatives, such as the Turkey Point Renewable Energy Park, Lancaster County can balance its need to preserve natural and agricultural resources with the need to accommodate new growth by maximizing the beneficial use of community assets. Renewable energy technologies are a viable means to balance Lancaster County’s desire to welcome new growth and the need to ensure that such growth does not overburden available resources. Furthermore, it is this type of forward-thinking leadership that will draw new residents and businesses to Lancaster County by creating unique places and public spaces for people to live and work.

“Modern solutions meet critical needs for clean energy, air quality and economic prosperity.”
Community Collaboration

In 2006, the LFG Plant was named Project of the Year by the Environmental Protection Agency’s Landfill Methane Outreach Program, a voluntary assistance program that helps to reduce methane emissions from landfills by encouraging the recovery and beneficial use of landfill gas as an energy resource. The addition of the Wind Project at Turkey Point further expands the efforts by LCSWMA to utilize more renewable energy and demonstrate that a variety of technologies are available and can be used in conjunction with one another. The Turkey Point Renewable Energy Park also advances the understanding of renewable energy and its benefits in the local community.

As part of LCSWMA’s commitment to the public education and acceptance, the Turkey Point Renewable Energy Park has been promoted to the public in the following ways:

Ribbon Cutting Ceremony

For each component of this initiative, the project partners hosted a Ribbon Cutting Ceremony to celebrate the accomplishment and provide an up-close look at the project. Various community officials, businesses, political figures and media representatives attended each event and publicly showed their support.

Public Presentations and Site Tours

LCSWMA regularly provides presentations on the Turkey Point Renewable Energy Park at a local, regional and national level. Site tours are offered recurrently, with LCSWMA hosting hundreds of visitors annually. Guests receive an overview of the park and a comprehensive site tour.

Each component of this initiative is an award winning project and has received tremendous community support.
Community Collaboration (continued)

Renewable Energy Educational Display:

In order to educate the public about the various renewable energy initiatives at the FFLF, LCSWMA installed an interactive, outdoor LCD display that features information on the LFG Plant, Turkey Point Wind Project, as well as solar energy. Users can watch videos and use the touch screen features to navigate the informational pages on the display.

In addition to fostering local, community support, the Turkey Point Renewable Energy Park required close coordination between the project partners (LCSWMA, PPLRE and Turkey Hill Dairy) and community/government officials. As a whole, the community overwhelmingly supports the Turkey Point Renewable Energy Park. LCSWMA receives inquiries on a daily basis, requesting tours and presentations on the various projects and initiatives at the FFLF. Local residents and businesses are proud of Lancaster County's Integrated System and the innovative way in which LCSWMA invests in smart, sustainable projects that foster economic development while promoting green living.

“LCSWMA is committed to public education and community support for its projects.”
INNOVATION & CREATIVITY
Innovative Goals & Objectives

When LCSWMA first considered developing the Turkey Point Renewable Energy Park, there were explicit goals and objectives the Authority, along with its business and community partners, wished to achieve:

- Develop sustainable renewable energy projects: 3.2MW landfill gas plant + 3.2MW wind energy micro-site;

- Supply a source of renewable energy (electricity) to area homes and businesses, plus provide a local manufacturing company with alternative sources of green energy, including steam for their commercial boilers and electricity for operations;

- Reduce both greenhouse (methane) gas and carbon emissions;

- Help preserve local jobs, as well as promote future business expansion and economic growth in the local community;

- Create a highly visible model for the viability of implementing small renewable energy projects, like wind and landfill gas-to-energy, next to large manufacturers in rural areas;

- Educate thousands of Pennsylvanians and future leaders about the benefits and feasibility of renewable energy projects and how that complements any personal or corporate plan for sustainability and green living.
Progressive Infrastructure & Sustainable Growth

The Turkey Point Renewable Energy Park advances innovative infrastructure by avoiding the harmful environmental impacts associated with conventional fossil fuel energy generation technologies such as coal. Unlike fossil fuels, landfill gas-to-energy, wind energy and solar energy provide electricity without adverse impacts to local air quality. To continue improving air quality in Lancaster County, and around the nation, a variety of strategies must be implemented to reduce harmful emissions; this includes the expansion of renewable energy technologies such as exhibited in the Turkey Point Renewable Energy Park.

As the world’s population continues to grow and new businesses take root, the demand on the local electric grid will continue to escalate. It requires innovative projects and initiatives, such as the exploration of on-site renewable energy technologies, to balance a desire to welcome new growth with the need to ensure that such growth does not overburden available resources.

The Turkey Point Renewable Energy Park encourages sustainable growth by maximizing the beneficial use of landfill space, which is an essential community asset. Insofar as the park is located at the FFLF, it exemplifies efficient land use planning since land reuse options at this site are limited. Solid waste management is an inescapable need in every community and an essential component to protecting the health and welfare of the public. When managed with innovation and foresight, solid waste disposal facilities can do more than serve as depositories for waste; they can serve other community needs such as wildlife habitat, open space/recreation and renewable energy generation. Through this innovative venture, the Turkey Point Renewable Energy Park maximizes the beneficial utilization of public land and supporting sustainable economic development in a rural area by lessening the demand on the local grid.
Finally, as the nation’s need for independence from oil continues to present itself as one of the most crucial issues facing our nation, the high visibility of this project makes a clear statement about the progressive nature of Lancaster County. As conventional extraction, processing and use continue to jeopardize the health and safety of the nation, the demand for action at the local level and community support for renewable energy technologies will continue to grow.

The Turkey Point Renewable Energy Park not only hosts the first commercial-scale wind project in south-central PA, but also a unique combination of factors not found anywhere else in the nation. It serves as an important landmark for the Lancaster County community, exemplifies a unique approach to landfill re-use and epitomizes innovation excellence in the solid waste management industry.

“"The Turkey Point Renewable Energy Park typifies a unique approach to landfill re-use.""