2016 SWANA Excellence Award Entry, Composting System Award,
Emerald Coast Utilities Authority

Title of Entry: Emerald Coast Utilities Authority Biosolids Composting Facility
Jurisdiction: Escambia and Santa Rosa Counties, FL; Baldwin County, AL
Approximate Population: 325,000
Cost per Household: $2.41 (current capacity)
Approximate Budget: $782,100 (current capacity)

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Executive Summary

The Emerald Coast Utilities Authority (ECUA) was originally created under the name Escambia County Utilities Authority in 1981 by an Act of the Florida Legislature to own, manage, finance, promote, improve and expand the water and wastewater systems of Escambia County and the City of Pensacola. The ECUA began offering garbage and yard waste sanitation collection in Escambia County in 1992. Curbside recycling service was introduced in January 2009, and in 2015, the Biosolids Composting Facility (BCF) opened. The BCF composes weekly about 400 tons of biosolids (about half of ECUA’s biosolids) and 500 tons of yard waste and will produce approximately 15,000 tons of finished compost annually. Plans are underway to double its capacity. ECUA is using the Modified Static Aerobic Pile method. The Emerald Coast bloom, the Most in Bio-Compost product is certified under the US Composting Council’s Seal of Testing Assurance program, a nationally-recognized compost testing program.

Section 1 Design and Planning of Composting System

About the Emerald Coast Utilities Authority (ECUA): Leading the Way with Environmental Compatibility Through an Integrated Solid Waste System

ECUA is a local government body, existing under the laws of the State of Florida. The powers of the ECUA are exercised by a five-member elected Board. ECUA provides garbage, yard waste, and recycling collection to unincorporated Escambia County (EC). Additionally, ECUA also owns and manages the water and wastewater systems for EC and the City of Pensacola. The Mission of the ECUA is to promote the quality of life of the Emerald Coast by providing water, wastewater, and sanitation services in an effective and efficient manner.

1.1 Planning Process Considerations

The origins of ECUA’s Biosolids Composting Facility (BCF) can be traced back to the planning phases of its Central Water Reclamation Facility (CWRF), which opened on September 30, 2010. The CWRF replaced an older wastewater treatment plant that had been damaged by Hurricane Ivan in 2004. Plans for a composting facility were included in the original design for the facility; however, were originally dropped to reduce costs. In 2011, ECUA conducted a study to determine the feasibility of constructing the BCF adjacent to the CWRF. At the time, ECUA was drying its biosolids using a natural gas-fired paddle dryer system located at the CWRF. The dryers were processing biosolids from all three of ECUA’s water reclamation facilities – a total of 120 wet tons of biosolids per day, with a solids content of 16-18%. The dried biosolids were marketed through a third-party vendor as a granular fertilizer product. However, the energy costs of operating these dryers became prohibitively expensive (approximately $90,000 per month in 2011).

At the same time, ECUA was paying about $10 per ton to dispose of its residential yard waste at a private landfill, which at the time was the most cost effective option. In early 2015, the landfill’s permit was revoked, forcing ECUA to pay nearly three times as much ($27.69 per ton) to dispose of yard waste at the EC-owned Perdido Landfill, which is a Class I Landfill with Landfill Gas to Energy. While the high costs of current practices were the push toward the BCF, ECUA was driven by the knowledge that it
could put its biosolids material to a higher and better use to create a compost product. By 2014, ECUA was well on its way to planning, designing, and developing a 24.5-acre site at the CWRF that would become the BCF.

1.2 Important Decision Factors

ECUA considered a number of factors while planning its BCF. The three most important were site selection, compost method, and economics.

1.2.1 Site Selection

One of the biggest considerations for a composting facility is site location. The CWRF sits on 2,220 acres of ECUA-owned, largely undeveloped land that allowed for an ideal site for the BCF. This gives plenty of buffer space between the BCF and any residential or commercial properties. It also sits above Category 5 hurricane flood elevation (minimum 50 feet above sea level), removing it from any potential flood issues.

The site’s adjacency to the CWRF was also a key factor (See Figure 1). Since all of ECUA’s biosolids were already either produced or processed at the CWRF, it was a natural decision to place the BCF at the same location, eliminating the need to transport biosolids long distances.

Figure 1: ECUA’s CWRF and BCF (cleared area on bottom right)

1.2.2 Compost Method

ECUA also needed to decide on the composting method that would be used at the BCF. The selected method drives all other factors, including capacity, size, capital and operational costs, and regulatory compliance. After evaluating Turned Windrow (TW) and Aerated Static Pile (ASP) methods, ECUA decided upon the Modified Static Aerobic Pile (MSAP) method, which is a state-of-the-art composting method and is particularly beneficial to biosolids composting. The MSAP method is a significantly faster and lower cost method than the TW or ASP methods. This method and its benefits will be discussed further in Section 2. Furthermore, the BCF is one of two biosolids composting facilities in the state implementing the MSAP process and the only one that is a public utility. The BCF is a leader in an efficient, cost-effective and innovative method for biosolids composting in Florida.
1.2.3 Economic Drivers

Another critical factor ECUA considered in the development of the BCF was the financial impact the facility would have on the Authority. As described above, the costs of treating biosolids and disposing of yard waste between 2011 and 2014 escalated, driving the decision to develop the BCF. An assessment of disposal cost and processing showed significantly reduced costs and the creation of a value-added material through composting. The economics and cost-effectiveness will be discussed further in Section 5.

1.3 Site and Operational Design

By mid-2014, plans were completed for the 24.5-acre site. The base layer is a graded slab of compacted recycled concrete for leachate and run-off management. The general design of the BCF is shown in Figure 2 and includes the following major features: (A) 3.5-acre Pre-Processing Area where yard waste is received and processed into bulking agent for composting. (B) 5-acre Active Compost Area where biosolids are received and blended with the bulking agent and composted in windrows. (C) 3.8-acre Curing & Storage Area where compost is screened, stabilized, and stored for distribution and marketing. (D) 2.4-acre Stormwater facility where leachate and run-off from Active Composting and Curing & Storage Areas are collected. (E) Lift station for pumping leachate and run-off from Stormwater Facility into (i) recirculation to maintain proper moisture in compost windrows and/or (ii) trucking/pumping to CWRF for treatment. (F) Perimeter berm and drainage swale to divert run-off away from Active Composting and Curing & Storage Areas. (G) Entrance road for delivery of yard waste to Pre-Processing Area.

Figure 2: Site map of ECUA’s BCF

Choosing the MSAP method was crucial in the design of the site. Because the MSAP method is a faster composting process than traditional-turned composting, more material can be processed on a smaller amount of land. The BCF has a capacity of 400 wet tons of biosolids per week, which is about half of the biosolids generated by ECUA, and about 500 tons of yard waste per week, which is 100% of the yard waste collected by ECUA.

1.4 Merits and Impacts of the Composting System

Once the design plans were completed, ECUA developed an operating plan for the BCF and applied to modify its wastewater permit from the Florida Department of Environmental Protection (FDEP) for the BCF, which was approved in August 2014. Construction then commenced, with a goal to open the facility by late 2015. The closure of the private landfill helped to fast track construction so that the BCF opened sooner than expected. On October 20, 2015, the BCF received its first load of biosolids and built
its first windrow. ECUA is now well on its way towards reaching its capacity throughput for the BCF. Looking forward, ECUA is already in the planning phase of expanding the BCF in order to handle all of ECUA’s biosolids.

1.5 Meeting a Standard of Excellence

As a provider of water, wastewater, solid waste collection and recycling, and yard waste services, ECUA is committed to meeting its Mission and Core Values for a high quality of life for the Emerald Coast community. The BCF demonstrates the synergy between water reclamation and solid waste management. Biosolids are a natural by-product of the water reclamation process. These are rich in nutrients, and by composting this material, these nutrients are able to be returned to the soil in a more beneficial and environmentally productive way than basic land application. On the solid waste front, ECUA already contributes significantly to EC’s goal of meeting the State of Florida’s 75% recycling rate mandate by the year 2020. Composting yard waste collected in the county, instead of landfilling, will make a significant stride towards this goal.

ECUA also sees the BCF end product, Emerald Coast bloom – the Most in Bio-Compost, providing a much needed product in the agricultural and horticultural community. The BCF is the first large-scale composting facility in Northwest Florida. It provides a high-quality soil amendment and compost product to local farmers, nursery growers, community gardens, golf courses, landscapers, and athletic fields. To assure these end users of the quality of the compost, ECUA is enrolled in the United States Composting Council’s (USCC) Seal of Testing Assurance (STA) program, which is a nationally recognized compost certification program.

ECUA’s dedication to this project is evident in the expediency of the facility’s development to reduce costs, which was accomplished in approximately one year from the initial design phases to startup operations. ECUA is in the unique position of managing all aspects of the compost process fully in-house, from producing the biosolids and collecting and grinding yard waste, to owning and operating the BCF and marketing the end product. This allows ECUA to create a truly closed-loop organics management system within the Emerald Coast community.

Section 2 Use of Equipment Systems and Technologies

2.1 MSAP – A State of the Art Process

ECUA has implemented a state-of-the-art composting process called MSAP, which has been approved by the EPA and FDEP (this will be discussed further in Section 3). The MSAP method is a windrowing method that is a hybrid between traditional TW and ASP composting. The key to MSAP is a proprietary inoculant of highly active composting microorganisms. This inoculant spreads across the surface of the windrow, underneath a capping layer, and the microbes essentially syphon oxygen into the pile, biologically simulating the ASP method. However, like the TW method, MSAP windrows need to be turned, although much less frequently than the TW method.

To implement the MSAP method, ECUA tips its biosolids (dewatered to 16-18% solids) onto a three-sided bunker of ground yard waste, which is ground on-site. More ground yard waste is added on top of the biosolids in a ratio of three parts yard waste to one part biosolids by volume, which makes a biosolids “Twinkie.” A windrow turner then runs over the pile, mixing the material and forming the windrow. The turner used by ECUA creates windrows that are 7-8’ high and 16-20’ wide. After mixing, the inoculant is added to both ends of the windrow and the entire windrow is covered with a 12” capping layer of screen-overs or fresh ground yard waste.
For the first 30 days, the windrows are static piles, with the first turning occurring on day 30; by comparison, the TW method requires five turnings within 15 days. After another 15 days, the MSAP windrows are removed for screening. The turning helps to create airspace and distribute moisture, facilitating further decomposition. On day 45, active composting is concluded and the compost is moved to a screen to separate finished compost from screen-overs. The finished compost must then cure for an additional 30 days before it is ready for distribution.

At capacity, ECUA is constructing one to two 200’-long windrows each day for five days per week. ECUA selected the MSAP method because of its many benefits, which include: (1) **Cost savings** – The MSAP process only requires two turnings. This saves on labor, fuel, and equipment maintenance costs. (2) **Reduced odors** – The fewer turnings reduces odor generated within the pile. The capping layer of yard waste also significantly reduces odors. (3) **Space efficiency** – The inoculant greatly speeds up the compost process, the active compost phase is only 45 days, meaning more material can be composted on a smaller area of land. (4) **Beneficial microorganisms** – The high population of beneficial microorganisms from the inoculant can create benefits beyond the windrow, including researched soil and crop health.

### 2.2 Composting Equipment Utilized

The microorganisms are the true powerhouses of the MSAP method and do the majority of the work that equipment might do in other waste recovery facilities; however, mechanical equipment is needed to assist them in doing their job. ECUA secured a second-hand tub grinder that was refurbished, instead of buying a new grinder, to grind all of the residential yard waste it collects. Not only did this purchase reduce waste generation by not buying a new unit (resource conservation), but it was also economical to help keep costs down. The Morbark 1300 grinder has a capacity of 50-70 tph.

ECUA purchased a brand new turner, a Backhus A-55, at the start-up of the BCF. ECUA selected the A-55 because of its performance rating, flexibility, fuel efficiency, and emission standards. The A-55 has a 47”-diameter, 16’-long drum, is capable of mixing 5,200 CY per hour, and produces a windrow up to 18’ wide by 8’ tall. It has a 388-horsepower diesel engine that meets EPA Tier 4 Final emission standards. For moving yard waste and compost around the site, ECUA uses several front-end loaders with a 3.7 CY bucket and a heaping capacity of 5.5 CY. This will move an entire 200’-long windrow to the screen in 11 or 12 buckets.

### 2.3 Waste Screening Process

Producing a usable compost product is essential to the success of the BCF. Large, non-composted woody materials must be separated from the finer, composted material. To do this, ECUA purchased a Komptech Multistar L3 Star Screen. ECUA decided on a star screen because of its improved ability to sort wet material compared with a trommel screen, in which wet material can clog the screen’s holes. Instead of direct diesel/hydraulic power, the L3 is all electric, which conserves fuel. The on-board 60 kV/A diesel generator uses 25% less fuel than a traditional direct diesel engine. The L3 has a throughput capacity of 325 CY of material per hour.

The L3 is a 3-fraction screen that produces a large fraction (>1 ¾”), is the non-composted woody overs, along with a medium textured (1 ¼” to 5/8”) and fine textured compost (<5/8”). The overs are returned to the active compost area to be used as the capping material on the windrows or sold as a mulch product. Medium textured compost is ideal for soil blending or top soil incorporation, while the fine texture is ideal for top dressing, especially on turf.
Contamination, particularly from plastic film, can be very problematic for compost operations. ECUA is taking a 3-fold approach to ensure contamination does not end up in the final product, **Emerald Coast bloom, the Most in Bio-Compost**.

1. **ECUA has launched a wide-spread public education campaign:** “**Brown is the New Green, Leaf the Plastic Behind!**” that encourages its residential customers to stop using plastic bags for yard waste and instead use compostable paper bags or reusable containers. This program will be discussed further in Section 6.

2. Any ground yard waste that inadvertently has an excessive amount of plastic bags is used as alternative daily cover at the County’s landfill and not composted.

3. The star screen is equipped with two wind sifters that pull out any lightweight contaminants during the screening process.

### Section 3 Regulatory Compliance

#### 3.1 Environmental Laws and Regulations Compliance

ECUA’s BCF strives for excellence to meet its Core Values as previously stated and that means its mission is to exceed environmental regulatory standards. In Florida, facilities that compost biosolids and yard waste are regulated under Chapter 62-640 of the Florida Administrative Code (FAC). Key regulations in 62-640 include: (1) Pathogen reduction, (2) Vector attraction reduction, (3) Class AA parameters, (4) Monitoring and (5) Distribution.

**3.1.1 Pathogen Reduction**

Pathogen reduction is of the upmost importance to ECUA to ensure it is distributing a clean, safe compost product. State regulations (62-640.600 FAC) defer to the federal regulations (40 CFR 503) for pathogen reduction. ECUA’s BCF meets federal Class A biosolids standards pursuant to 40 CFR 503.32 (a)(8), which requires fecal coliform to be less than 1000 most probable number (MPN) per gram of total solids and Salmonella to be less than 3 MPN per 4 grams of total solids. ECUA’s monthly test results show that these pathogens were either below detection level or well below these regulatory thresholds.

ECUA is also following an equivalent Process to Further Reduce Pathogens (PFRP). Since the MSAP is a hybrid process of TW and ASP composting, PFRP requires that temperatures must exceed 55°C (131°F) for three consecutive days on the surface of the pile (below the capping layer), and for 15 consecutive days inside of the pile. ECUA is measuring temperatures using a wireless temperature probe daily at a depth of 12” and 36”. This information is rolled up into software that came with the probe for monitoring and analysis. ECUA’s windrows have all well exceeded these standards. (see Figure 3-1)
3.1.2 Vector Attraction Reduction

Rodents and insects are more than a nuisance to compost facilities; they can be a vector for spreading disease. For the safety of its employees and the public, ECUA follows state regulations for Class AA vector control (62-640.600 FAC), which again defer to the federal regulations (40 CFR 503). ECUA’s BCF complies with 40 CFR 503.33(b)(5) by maintaining temperatures above 40°C (104°F) and average temperature above 45°C (113°F) for 14 consecutive days. As can be seen in Figure 3-1, ECUA again exceeds these regulations.

3.1.3 Monitoring

ECUA continuously verifies compliance with all regulations through daily temperature monitoring and monthly sampling for compost analysis. Biosolids compost must be analyzed for all the Class AA parameters (Class AA), as well as total nitrogen, total phosphorus, total potassium, total solids, and pH. Additionally, ECUA became a member of the USCC STA program. Through this program, ECUA is required to regularly test its compost at an STA-certified lab and make these results available to the public. Testing in the STA program includes all required analysis for state compliance, as well as several additional agronomic properties (see Figure 3-2 for ECUA’s most recent test results). As these results show, ECUA compost is well...
below Class AA thresholds for all parameters.

### 3.1.4 Class AA Parameters

ECUA is committed to ensuring its biosolids compost is of the highest quality possible, which means meeting FDEP’s Class AA biosolids standards. Class AA biosolids compost must meet the above requirements for pathogen and vector attraction reduction, as well as be within the compost analysis thresholds in Table 3-1 (62-640.700(5) FAC).

#### Table 3-1: Class AA Biosolids Parameter Threshold Concentrations

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Monthly Average Concentrations (mg/kg dry weight basis)</th>
<th>Ceiling Concentrations (mg/kg dry weight basis)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic</td>
<td>41</td>
<td>75</td>
</tr>
<tr>
<td>Cadmium</td>
<td>39</td>
<td>85</td>
</tr>
<tr>
<td>Copper</td>
<td>1500</td>
<td>4300</td>
</tr>
<tr>
<td>Lead</td>
<td>300</td>
<td>840</td>
</tr>
<tr>
<td>Mercury</td>
<td>17</td>
<td>57</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>N/A</td>
<td>75</td>
</tr>
<tr>
<td>Nickel</td>
<td>420</td>
<td>420</td>
</tr>
<tr>
<td>Selenium</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Zinc</td>
<td>2800</td>
<td>7500</td>
</tr>
</tbody>
</table>

### 3.1.5 Distribution

ECUA’s BCF is producing a value-added product; therefore, sale and distribution of the compost, **Emerald Coast bloom, the Most in Bio-Compost**, is vitally important. State regulations (64-630.850 FAC) require compost to be registered as a fertilizer for distribution, unless it is both certified under the USCC STA program and is outside the Lake Okeechobee, St. Lucie River, and Caloosahatchee watersheds (in Central and South Florida). ECUA has enrolled in the STA program and is limiting distribution to Northwest Florida and surrounding areas; therefore, it is not required to be registered as a fertilizer. Furthermore, ECUA tracks all compost that is distributed and provides monthly compost distribution and marketing reports to the FDEP.

### 3.1.6 Odor Mitigation

Although there are no specific regulations for odor, ECUA is committed to being a good neighbor and preventing or reducing odors whenever possible. ECUA is taking a three-fold approach to preventing issues with odor: (1) The site selected for the BCF is more than 3,000 feet from the nearest residential property and 4,000 feet to the nearest commercial property, meaning any odor, if generated, would have minimal impact on neighbors. (2) The MSAP process requires less than half the turnings of a traditional windrow system, which eliminates the number of odor plumes that can occur during turning. The MSAP process also utilizes a capping layer of yard waste or compost overs that act as an effective in-situ biofilter over the windrow. (3) ECUA also implements a comprehensive odor monitoring protocol and takes corrective action based on the type of odor identified.
3.2 Supporting Documentation

3.3 Regulatory Citations

The BCF has not received any citations.

Section 4 Worker Health & Safety

4.1 Training

Four ECUA employees attended the USCC’s Compost Operations Training Course held in Apopka, FL on November 16-20, 2015. Topics in this training included:

- Compost fundamentals
- Feedstocks and compost recipes
- Compost systems and methods
- Equipment
- Site selection and design
- Water management
- Monitoring procedures
- Odor management
- Regulations
- Sampling and testing
- Compost benefits
- Compost marketing
This was a valuable experience for ECUA staff, enabling them to learn from industry professionals and gain the knowledge they needed that has led to the success of the BCF.

In addition to four ECUA biosolids composting staff taking a USCC-provided training, a one and a half day training course was given on December 4-5, 2015 to 11 ECUA employees who did not attend the USCC training. This covered a similar range of topics, but the content covered was Florida-specific.

- Module 1: Composting Fundamentals
- Module 2: Regulatory Compliance
- Module 3: Overview of Composting Methods
- Module 4: Site Selection and Facility Design, and Equipment Selection
- Module 5: Receiving, Mixing and Windrow Turning
- Module 6: Operations – Active Composting
- Module 7: Operations – Curing and Post Processing
- Module 8: Compost Quality and Testing

As a result of these intensive trainings, the BCF has a lean but effective team of highly skilled compost professionals.

4.2 Safety Procedures and Enforcement

Safety is the number one priority for ECUA and its employees. All of the BCF’s employees have experience operating and working around large equipment. Nevertheless, constant vigilance is maintained every day to ensure the safety of everyone on site. The following are specific safety procedures: lock-out/tag-out, use of PPE, and limited site access.

ECUA enforces its safety procedures by using discipline, guidelines, and a progressive corrective action process in addition to a safety incentive program. A key to enforcing safety procedures is having an Operations Manual that sets the protocol and process flow for workers in the biosolids composting area. ECUA does have an Operations Manual as a requirement of gaining its permit with the FDEP and for training, educating and enforcing worker safety.

4.3 Injury Rate

Because of ECUA’s comprehensive safety plan, there have been no injuries associated with the BCF.

Section 5 Performance, Economics, and Cost-Effectiveness

5.1 Program Success

Already ECUA’s BCF has been an overwhelming success. The primary objective for the BCF was to put ECUA’s biosolids and yard waste to a higher and better (and more economical) use. To date, the BCF has composted 1,770 wet tons of biosolids and 7,080 CY of ground yard waste. It is on-track to compost half of the biosolids ECUA processes, with plans underway to double the size of the BCF in the near future to compost all of ECUA’s biosolids.
The BCF has produced 1,195 CY of finished compost since its inception, with 5,700 CY of compost currently at various stages of the process. One of the crowning achievements of the BCF is the stellar results of the compost analysis (Shown in Section 3). Not only does the compost fall far below regulatory thresholds of pathogens and heavy metals, but falls within the optimum or acceptable range of several agronomic properties as determined by the USCC (See Table 5-1).

Table 5-1: Select Agronomic Properties of ECUA’s Compost

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Units</th>
<th>Preferred*</th>
<th>Acceptable*</th>
<th>ECUA’s compost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stability</td>
<td>mg CO₂-C per g OM per day</td>
<td>&lt;2</td>
<td>&lt;4</td>
<td>&lt;0.1</td>
</tr>
<tr>
<td>Maturity</td>
<td>% seed emergence &amp; vigor</td>
<td>90-100%</td>
<td>80-100%</td>
<td>80% - 96%</td>
</tr>
<tr>
<td>Moisture Content</td>
<td>% wet weight basis</td>
<td>40-50%</td>
<td>35-65%</td>
<td>58% - 60%</td>
</tr>
<tr>
<td>Organic Matter</td>
<td>% dry weight basis</td>
<td>35-60%</td>
<td>25-65%</td>
<td>49% - 54%</td>
</tr>
<tr>
<td>pH</td>
<td>pH units</td>
<td>6.0 - 7.5</td>
<td>5.5 - 8.5</td>
<td>6.7 - 7.4</td>
</tr>
<tr>
<td>Soluble Salts (Electrical Conductivity)</td>
<td>dS/m (mm-hos/com) dry weight basis</td>
<td>&lt;5.0</td>
<td>&lt;15.0</td>
<td>1.22 - 1.92</td>
</tr>
<tr>
<td>Physical Contaminants</td>
<td>% dry weight basis</td>
<td>&lt;0.5%</td>
<td>&lt;1.0%</td>
<td>None detected</td>
</tr>
</tbody>
</table>

*Preferred and acceptable ranges are provided by the USCC.

The Emerald Coast bloom – the Most in Bio compost product is new and has only been actively sold starting February 2016. ECUA has distributed compost to a number of local farms and nurseries, and is in discussion with a large-scale local sod farm to be a potential bulk contract partner of the BCF. ECUA is also in talks with the Florida Department of Transportation to provide compost as a soil blend material for an upcoming landscaping project at the Escambia County Welcome Center located at the Florida/Alabama state line. This would be a highly visible project in the community.

One of the biggest lessons learned is to better manage temperature monitoring. An ECUA employee had been using a manual temperature probe to monitor windrow temperature every day. This was costing a significant amount of man hours, which became prohibitive as the number of windrows increased. As a result, ECUA purchased and installed 43 remote sensing thermometers (EcoProbes), and temperature data can be accessed 24-hours a day via the internet. This has allowed ECUA to more quickly, reliably, and continuously monitor across all of its windrows, while freeing up the employee to focus on other tasks.

5.2 Downtime

As discussed in Section 2, the real heavy lifters in the MSAP composting methods are the microorganisms, and they don’t require downtime. The turner, grinder, front-end loader and screener are used as needed, which allows repairs and maintenance to be conducted without significantly affecting the operation. The only significant downtime the BCF has experienced was in February 2015, when a manufacturing defect caused the brand-new turner to become inoperable for 2 weeks. Fortunately, ECUA was able to get a representative onsite to repair the equipment.

5.3 Customer Service

Customer service is a paramount concern for ECUA, and the BCF operation is no different. ECUA considers education and outreach (E&O) to be a vital customer service tool to implementing and
maintaining a successful biosolids composting program. A good clean yard waste and compost program depends on the participation of key target generators and end user target markets. The composting operation has two sets of customers: (1) ECUA’s residents that receive yard waste collection service and (2) compost bulk end users. ECUA created a four-tiered E&O approach to ensure program sustainability – (1) Reducing contamination by designing for the public the “Brown is the New Green, Leaf the Plastic Behind!” campaign for preparing clean curbside material. (2) Informing and educating the public about the new facility. (3) Educating compost operations and administration staff as detailed in Section 4. (4) Educating local and regional end user markets about the product. This will be discussed and detailed further in Section 6.

Finding a market for compost can make or break a compost operation. ECUA has been reaching out to a number of potential end user markets to develop a compost market in the Pensacola/Escambia County area (more on this outreach in Section 6). In this initial phase of market development, ECUA is partnering with interested end users for a trial period and offering compost at a discounted rate. ECUA is maintaining contact with these end users to get feedback on their results of using the compost, what they like about it, and what they don’t. These trial results will be considered by ECUA to help create the best compost product it can.

5.4  Economics

As previously discussed, the cost of “business as usual” was the driving force behind the BCF. Drying biosolids with natural-gas heaters and disposing yard waste in a Class I landfill became prohibitively expensive. Therefore, cost savings are the overarching economic benefit to the BCF.

The cost of drying biosolids was approximately $35 per wet ton of biosolids. This translates to $126,000 per month (at 120 tons of biosolids per day). ECUA was selling dried biosolids at $15 per dry ton, but since a wet ton of biosolids is only 16-18% solids, this equates to only $2.55 per wet ton in revenue. The net cost of drying biosolids was therefore $117,000 per month.

Yard waste disposal fees were $27.69/ton at Escambia County’s landfill. ECUA collects an average of 2,166 tons of yard waste per month, which equates to a monthly cost of $60,000. Therefore the total net “business as usual” cost is approximately $177,000 per month.

The BCF has an estimated monthly operating cost of $65,175 at its current capacity. To double capacity to handle all of ECUA’s biosolids, operating costs would be $130,350 per month.

The current capacity of the BCF will generate about 2,700 CY of compost per month. ECUA is selling its finished compost according to the price table in Table 5-2, based on amount sold. Even at the lowest price ($4 per CY), compost sales will generate $10,800 per month at current capacity ($21,600/CY once capacity is doubled). ECUA will have more information on actual sales and revenue after one year in operation and large bulk sales of material occur.

<table>
<thead>
<tr>
<th>Table 5-2: ECUA’s Compost Sales Price Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>0-10 CY</td>
</tr>
<tr>
<td>10-40 CY</td>
</tr>
<tr>
<td>40+ CY</td>
</tr>
</tbody>
</table>

Therefore at full capacity with all compost sold, the net operating cost of the BCF is estimated at $108,750 per month. This means in operating costs, the BCF will save ECUA $68,250 per month compared to drying biosolids and disposing yard waste.
Section 6 Public Acceptance, Appearance, and Aesthetics

6.1 Public Relations

ECUA strives to be a good neighbor in the community. Public relations is essential to the success of the BCF, and ECUA emphasizes this at all steps of the process, from obtaining a clean yard waste material to working with local end users to develop a market for the compost.

6.1.1 Residential Curbside Outreach, Keeping it Clean

Clean compost starts with clean feedstock. Because ECUA shreds all of its residential yard waste, plastic bags can be problematic for the operation of the BCF. Shredded plastic is difficult to remove, even with the wind sifter on the star screen. Plastic fragments in the finished compost can significantly reduce the quality and uses of the compost. To prevent this, any yard waste that has a significant volume of bagged material is not used at the BCF and is instead used as alternative daily cover at Escambia County’s landfill, which of course is not putting yard waste to its highest and best use.

To maximize the usability of all yard waste at the BCF, ECUA launched a residential community-wide educational campaign in the spring of 2015, as construction of the BCF was underway. Entitled “Brown is the New Green, Leaf the Plastic Behind!” the campaign’s primary message is to encourage its residential customers to switch from plastic bags to compostable paper bags or reusable containers for containing residential yard waste. ECUA designed the campaign logo and produced 72,000 – one truckload (minimum order) 18-gallon compostable yard waste paper bags branded with the logo and imagery. The bags are distributed at any community event in which ECUA participates (i.e., Earth Day events or when we address civic organizations) and a number of locations such as Ever’man Co-op. Concurrent with the development of the logo was the placement of online advertising with the use of ‘block’ and ‘tower’ banner ads. These ads are linked to ECUA’s ‘livegreenECUA’ website, dedicated to promoting the Authority’s varied environmentally friendly programs, including a page specifically focused our composting program that can be found at: http://www.livegreenecua.com/composting.php

In addition, ECUA branded six of its yard waste collection trucks with 4’ x 9’ panels on each truck side that will act as mobile billboards on collection routes. Through this effort, ECUA is seeing marked reduction in the amount of plastic bags in its residential yard waste. This, combined with the instructional guidelines printed on the back of brown bags, has helped to create a behavioral change among our residential customers.

ECUA staff placed an 8” x 10” ad in the Escambia County School District 2015-2016 calendar in July 2015. The calendar was distributed to 45,000 students plus teachers county-wide at the beginning of each school year. This ad appears in the April
2016 page and is open for a whole month of exposure in classrooms and kitchens throughout the school district. ECUA was very pro-active in getting the public education program established in advance of the facility's operation, and is an illustration of foresightedness. Finally, ECUA public information staff produced a short informational video on the composting facility and program, which is located on YouTube and linked on both ECUA websites. It may be accessed at this location: https://www.youtube.com/watch?v=N3bQPvVjuXc&feature=youtu.be

6.1.2 Community Outreach, Promoting the Facility and Brown Bag Program

ECUA’s Public Information staff promotes the program extensively through community partners, as mentioned above (e.g. Community Support Agriculture’s (CSA) garden; Ever’man Co-Op and farmers; and Myrtle Grove Neighborhood Watch Association), on-site compost facility presentations, and radio and TV interviews with local media.

These video and PowerPoint presentations give ECUA an opportunity to promote the campaign as well as find potential end users for the compost. More importantly, ECUA sees the BCF as being an integral part of helping the community work toward its core values by creating a sustainable path for our yard waste and biosolids.

Newspaper articles about the facility during design, construction and operational phases were featured in five local publications or news outlets: Around Heron’s Forest, Florida Water Daily, News Talk 1340 WCOA AM Website, Pensacola Today, and The Pensacola News Journal FaceBook page. These may be accessed through the following links:

http://www.wcoapensacola.com/2016/01/19/ecua-composting-program-1-19-16/
http://aroundheronsforest.com/2015/05/26/ecua-yard-waste-biosolids-composting/
https://www.facebook.com/pnjnews/posts/10156542690380096
http://floridawaterdaily.com/2016/01/19/ecua-rolls-out-new-composting-program/
http://studeriorg/2015/06/ecua-composting-facility-moving-ahead/

6.1.3 End-User Outreach, Marketing the Product

On February 29, 2016, ECUA held a field day at the BCF for potential end users of the compost to kick off its marketing outreach. End users at the open house included nursery growers, sod farmers, landscapers, community-garden organizers, Escambia County Parks and Recreation, and FDOT. This gave the end users a chance to learn how the BCF operates, see the equipment operate, and become familiar with the final compost product. The open house also allowed ECUA to establish partnerships with some of these end users for compost trials. Leading up to the event, the following marketing activities were completed – (1) Develop an end user directory in 13 industries (240 contacts) to establish the target audience. (2) Invite, via a mailed post card to end users, to attend an end user marketing field
day at the biosolids composting facility. (3) Contact and follow-up with end user market targets by telephone, in-person and on-site at the biosolids facility.

ECUA’s End-User Open House

ECUA’s Biosolids Product Logo

ECUA is continuing to reach out to additional end users for future compost trials and to develop a compost market in the Pensacola/Escambia County area. The finished compost will be marketed under the name “Emerald Coast bloom – the Most in Biocompost” (see logo) so that it can brand its product in the local marketplace.

ECUA has also developed a comprehensive packet for end-users that includes salient information on the BCF, compost prices, the STA program, the MSAP process, test results summary and interpretation, temperature monitoring results, compost usage, and frequently asked questions. Further, the ECUA, and we will provide the monthly test results and compost technical data sheet to customers upon request.

6.2 Facility Cleanliness

Because ECUA will open the BCF both for purchasing of compost and for tours, the facility must be kept clean in order to maintain a positive image in the community. Composting, especially biosolids composting, can suffer from a perceived “ick” factor among the general public; therefore, maintaining a clean and odor-free facility is essential to overcome this stigma. Typically, one of the worst odor offenders at a biosolids composting facility is the mixing pad where raw biosolids are mixed with yard waste. ECUA avoids this altogether by building a yard waste bunker and tipping and mixing biosolids within the windrow itself so that there is no separate mixing pad. The following are other ways ECUA is ensuring a clean and aesthetically-pleasing facility:

- The biosolids truck operator follows strict protocols so there are no fugitive biosolids in the area.
- The mixer and front-end loader are cleaned as needed.
- Windrows and storage piles are kept tidy after turning or moving materials.
- ECUA staff regularly picks up litter around the site, especially with regard to shredded plastic from the yard waste grinding operation.