EXECUTIVE SUMMARY

In 2007, the Lee County Solid Waste Division (LCSWD) recognized the need to provide a safe, environmentally-responsible and cost effective solution to manage locally generated biosolids.

With development of the Lee County Composting Facility (LCCF) approximately 120,000 wet tons (approximately 18,000 dry tons) of biosolids have been diverted from land application sites and/or landfills in Southwest Florida.

The LCCF achieves this mission by recycling locally generated biosolids and yard waste using windrow composting to produce Class AA compost which is utilized by Lee County and its residents and is marketed as OrganicLee® Compost.

The project has benefited numerous Southwest Florida communities located near land application sites by eliminating the odors, traffic, noise and potential ground and surface water contamination resulting from the continued operation of land application sites.

The beneficial use of both biosolids and yard waste in the composting processes enhances Lee County’s commitment to meeting the State of Florida’s 75% recycling goal.
COMPOSTING SYSTEM DESIGN

The LCCF uses static aerobic piles to process the biosolids to create the compost. Biosolids and mulch are received under cover at the facility.

The operators have developed their “recipe” based on facility experience from working with different biosolid feedstocks, varying climates, and mulch consistency (moisture and particle size).

During the wet season the mulch will have higher moisture contents. Utilizing a dry season recipe during wet periods can result in a collapse of pore spaces in the pile short circuiting the passive air movement.

Biosolids, per agreements with each wastewater treatment plant, are required to be at least 12% solids. At this level, in accordance with Department of Environmental Protection regulations, the materials are considered solid waste. Most wastewater plant biosolids average around 15% solids but variances do exist.

Presently, the facility is receiving biosolids feedstock from seven different plants representing 4 different municipal systems. These include Lee County Utilities, City of Cape Coral utilities, City of Fort Myers Utilities and City of Naples Utilities.

The facility is comprised of approximately 8 acres of paved surface and divided into three principal areas, primary composting area, composting and curing area and material storage.

The primary composting area consists of six (6) single span, fabric covered metal buildings. This type of building was chosen for several design features that made it compatible with the facility. The buildings are lightweight compared to their pre-engineered metal building counterparts although foundations were oversized to account for uplift in meeting hurricane wind load codes. The buildings are rated to withstand a 120 mph force.
COMPOSTING SYSTEM DESIGN

The fabric allows translucent light to penetrate into the work area eliminating the need for electric lights for daytime operation.

The buildings were designed to have side-walls that leave a 15 foot clearance and end walls that leave an 18 foot clearance for equipment movement as well as allowing air movement through the buildings from any direction.

During the wet season, the buildings prevent precipitation from contacting the windrow piles and during the dry season the buildings restrict excessive sunlight and drying of the piles.

Lastly, two (2) large, 12 foot diameter fans were installed in each building. These fans move large volumes of air in the buildings and during windrow turning to discourage water vapor and condensation from collecting on the steel trusses and resist long term corrosion. All steel members are hot dipped galvanized.

After initial operation, it was quickly realized that to ensure consistent quality control with the finished screened product, storage under cover was necessary. As such, one of the six buildings was converted to a product storage building.

Additionally, an equipment wash down area was installed to allow for equipment cleaning and decontamination when switching equipment around various operational tasks and reducing the potential for cross contamination.
COMPOSTING SYSTEM DESIGN

The buildings include curbing and catch basins to collect precipitation run-on as well as any process water released from the windrows. To date the generation of these liquids as been little to non-existent but these design features as well as certain operational protocols are in place to prevent discharge of process water.

Included adjacent to the composting buildings are water supply hydrants. These hydrants allow for connection of the site’s water supply to the compost turner for moisture additions while turning windrows when piles fall out of the preferable moisture content range that maximize the efficiency of the biologic process.

Stormwater off other areas of the site is collected and controlled through the onsite stormwater system associated with the landfill. As a unique feature, the facility was sited within the footprint of future landfill areas at the Lee/Hendry Landfill in Felda, FL.

Being contained within the footprint allowed the facility to not only use the onsite stormwater system but also utilized exiting monitoring wells that are part of the landfill’s monitoring network to evaluate any potential nutrient loading impact. To date no impacts have been observed.
REGULATORY COMPLIANCE

The LCCF takes great pride in an exemplary compliance record. The LCCF has not been the subject of any notices of violation or negative remarks during annual inspections performed by the FDEP. Key to this compliance record are several factors: strict adherence to regulatory standards, trained personnel that understand both the regulations as well as the “art” of composting, regular monitoring, and strong housekeeping practices.

Although listed last, a strong housekeeping culture eliminates many issues during the composting process.

The site is regularly swept and cleaned to keep materials out of travel lanes and to keep spaces between windrows clear of materials.

This prevents material from being “lost” in the process and ensures that all material has gone through the thermal treatment required to reduce pathogens and vector attraction under 40 CFR 503.

One item of concern that was identified early in the process due to the operating team’s background with environmental monitoring at the landfill was cross contamination.

Equipment is dedicated to certain roles within the facility. Specifically, one loader concentrates on building windrows from raw feedstock and one loader manages materials after the 40 CFR 503 standards have been met as well as managing loading of equipment prior to distribution.

The only equipment that regularly touches all phases of compost is the Backhus 17.55 windrow turner. After morning readings of windrows are taken for temperature and carbon dioxide levels, this machine will begin turning windrows starting with the oldest windrow and proceeding to the newest and ultimately to raw piles just built.

Should this equipment or the loader building new piles need to switch locations for any reason, the equipment is taken off-line to be cleaned and decontaminated by pressure washing with a biodegradeable sanitizing solution.

After decontamination, the equipment is suitable to come in contact with materials that are farther along in the process without the risk of reintroducing pathogens such as fecal coliform or salmonella. The facility has a spotless record in meeting the pathogen reduction standards over the course of its three plus years of operations.
The facility was inspected by the EPA under a Facility Self Monitoring Evaluation and was deemed to be fully compliant with the recordkeeping, monitoring and testing requirements of 40 CFR 503.

Additionally, the inspector noted that he “appreciate(s) the time and professional courtesy extended by you and your staff.”

The facility has been a tour destination for a number of public agencies interested in composting and is routinely visited by large scale compost customers. These mostly include orange grove managers.

As a testament to this strong monitoring and environmental compliance record, the facility was recently awarded the 2014 Biosolids/Residuals Program Excellence Award from the Florida Water Environment Association.

The facility was also a past recipient of the Urban Land Institute’s Sustainability Award in 2012.
PLANNING

The LCCF was constructed in anticipation of two primary events:
1) changing of regulations regarding land application of biosolids, and
2) provide cost effective waste treatment for county residuals.

In 2010, regulations were adopted that would make future biosolids land application increasingly difficult for existing operations. Further, Lee County and neighboring Hendry County have a majority of lands contained within the Lake Okeechobee Watershed Protection Program, more locally identified as the North Everglades and Estuary Protection Program for the Caloosahatchee River Watershed.

As such, the land application of biosolids is prohibited. OrganicLee® Compost is a Class AA biosolids, a registered fertilizer (FL Fertilizer Lic. No. F1827), and has unrestricted use, including within the watershed protection area subject to nutrient loading restrictions that landowners are responsible for determining.

The Lee County Utilities division was considering construction of a $15 million biosolids drying and pelletizing operation in 2007.

The Utilities Division, in joint conversations with the Solid Waste Department, agreed to support the Solid Waste Department’s efforts to develop a co-composting facility by providing a long term guarantee to deliver biosolids to the Solid Waste Department.

Once constructed, two other local utilities, the City of Cape Coral and the City of Fort Myers, amended their solid waste interlocal agreements with the County to add the delivery and processing of biosolids.

Most recently, the City of Naples issued an RFP for the composting of their biosolids. A transportation vendor was awarded the contract under the provision that the biosolids were delivered to the LCCF.

Currently the facility is undergoing expansion that will allow the facility to process nearly 100% of the biosolids received and avoid landfill disposal. The expansion will add three additional single span buildings as well as over 10 acres of curing area plus additional ancillary facilities. Construction began April 21, 2014. The County has also been developing relationships with local agriculture operations to ensure a need and use for the final product.
Operationally, the County recognizes that its personnel and equipment are the keys to the program’s success. Personnel routinely attend onsite training sessions with senior personnel to review compost basics, equipment maintenance, health and safety training, as well as information on end uses of the product.

The primary equipment consists of wheeled loaders and a windrow turner. Should any of the wheeled loaders suffer major mechanical problems, loaders form other operations within the Department can be relocated or rental equipment is obtained to maintain production.

The windrow turner is a front line key piece of equipment. As there can be significant lead times associated with obtaining major components, the County maintains an aggressive spare parts inventory to minimize unscheduled downtime.

Should a catastrophic event occur, the County can continue to operate using traditional turning methods using wheeled loaders without suffering major process interruption.
PERFORMANCE|ECONOMICS|COST EFFECTIVENESS

The primary function of the facility is the treatment of biosolids to create a product that does not require landfilling. The facility has been successful in treating over 30,000 wet tons of biosolids annually (approximately 4,500 dry tons). Part of this success is strict compliance with the testing requirements for Class AA biosolids. The final product has not failed pathogen or vector reduction testing and has maintained heavy metal concentrations well below ceiling standards.

The primary drivers for a successful program that utilizes a biological process is consistency in operations and the ability to adjust to variables on a daily basis. Prior to initial distribution of materials, the LCCF operated for over 6 months to refine the protocols for materials acceptance, windrow construction, windrow turning protocols, screening procedures, and testing.

Operators experimented with different pile construction techniques, became familiar and proficient with monitoring equipment and data recording, and evaluated daily monitoring reports to determine work assignments. Often work assignments are pile specific depending on temperature conditions, moisture conditions and age of the pile. Once confident in our ability to consistently create a high quality product the program began marketing and distribution of OrganicLee® Compost.

One significant change during facility construction was the procurement of a larger windrow turner. The County initially investigated the feasibility of the project using a pull-behind turner that required a tractor to pull the turning unit. Although effective, the production capacity on this equipment was limited. The resulting windrow was approximately 4 feet high and 10 feet wide. Each building could hold 6 windrows resulting in an effective building capacity of just over 500 cy.

Moving to the Backhus unit, windrow piles are 8 feet high and 16 feet wide resulting in a building capacity of just over 1,700 cubic yards or a 340% capacity increase. Spread over 5 production buildings, the increased production capacity for the capital equipment investment was justified.

The facility is part of the County’s Integrated Waste Management System. Initial financial analysis performed during project development using tipping fees from mulch and biosolids as well as outbound sales indicated that capital costs would be recovered within approximately 6 years. Current production and operating estimates continue to support that analysis.
During construction of the facility, the County acquired the primary windrow turner, a Backhus 17.55 along with a water wheel attachment for adding moisture to windrows from the onsite hydrants.

The County went through a performance based bid process to select a machine that met operational and maintenance specifications as well as provide the lowest capital cost. Of the four units evaluated, the Backhus best met the criteria. The Backhus uses hydraulic pressure to control both the drum and the forward drive. Should a section of pile be difficult to drive through, the hydraulics redirect power to the drum from the forward drive. After the drum clears the resistance, hydraulics are returned to normal operating parameters.

The unit features easy access areas for the engine and hydraulic motor. The Backhus unit had one of the smaller engines at about 275 horsepower but met performance specifications for throughput. One benefit over the life of the equipment due to the smaller engine is reduced fuel use. The drum has a variable speed controller and the top rpm of about 230 rpm promotes the “tossing” of material versus shredding at higher rpm’s of similar units.

Fuel consumption was a primary factor in selection of the facility’s screen. The facility uses a Doppstadt 720 trommel screen. This unit uses only 2 gallons per hour for screening operations.

The Doppstadt, similar to the Backhus offers easy access panels to major maintenance areas. The trommel drum can be removed with forks on a wheeled loader when the access panel is opened.
EQUIPMENT|SYSTEMS|TECHNOLOGIES

The primary wheeled loaders used onsite are a John Deere 544 for pile construction and a Volvo L110 for material movement (screening, pile relocation and truck loading). The Volvo has an oversized, front tipping bucket that allows loading of walking floor trailers from the ground. The bucket has a 9 cubic yard capacity with a heaped capacity of approximately 12 cubic yards. This allows loading of retail delivery vehicles in about 3 scoops and walking floor trailers with about 4-5 scoops. Previously material was loaded from a ramp using a John Deere 644 with a 5 cubic yard bucket. The newer Volvo wheeled loader has reduced loading and material movement times.

WORKER HEALTH AND SAFETY

Workplace safety is very important to facility operations. As employees are dealing with raw biosolids, biological decomposition activities and heavy equipment the potential for injury from mechanical parts or exposure is great. Site supervisors perform safety talks weekly as well as conducting daily “tailgate” sessions at the start of operations.

Typical safety talks include common subjects such as slips trips and falls, lock out-tag out, heat stress avoidance, equipment mounting and dismounting. Additional safety items specific to composting include proper PPE and use and proper hygiene. Employees are provided uniforms and work boots so that they do not bring work and its hazards home. Required PPE includes safety glasses and safety vests. Due to the regulations at the time of the program’s inception, several of the equipment operators are certified wastewater treatment plant operators. We have since been able to revise our permit to require a SWANA Certified Composting Program Manager in lieu of WWTP certifications. The current site manager and his superior are SWANA Certified Composting Program Managers.
The majority of distribution for the Class AA biosolids compost is with nearby agricultural businesses. These agricultural interests represent over 85% of annual demand and the request for additional material continues to grow. Annually, material is “sold out” or spoken for more than five (5) months in advance.

The agricultural interests, mostly consisting of orange groves, have seen positive results in terms of maintaining yields and supplanting all or a portion of synthetic fertilizer use, decreased irrigation needs, and increased disease suppression.

Currently, research is being done by the University of Florida regarding disease suppression with increased organic matter in orange grove soils. There is also anecdotal evidence of benefits from the microbial activity added through the use of compost.

As required by the Florida Department of Agriculture and Community Services (DACS) Fertilizer Rules, Chapter 5E-1, FAC., in order to authorize sales and increase public awareness and acceptance of its composted biosolids, the LCCF has registered its Class AA compost as fertilizer (License # F1827).

In an effort to help ease public concerns related to product safety and to combat the stigma associated with biosolids compost, the LCCF also enrolled in the United States Composting Council’s Seal of Testing Assurance (USCC STA) Program. The USCC STA Program is a testing, labeling and information disclosure program designed to give compost customers the information they need to get the maximum benefit from using compost.

The Program ensures that materials enrolled in the Program meet consistent quality standards as well as all applicable regulatory standards. Program enrollees are required to disclose test results to all potential and current customers upon request.

---

Mr. Howard,
THANK YOU SO MUCH FOR OUR COMPOST!!!!!! It’s like Christmas here today. We can’t wait to get start-ed with our planting. The seedlings are ready, and we are very grateful for your donation of rich compost. We appreciate your generosity.

Since this is for our Learn and Serve Florida activities, please let me know the value of your donation so that you can be properly credited.

I hope you will visit our school some-time in January to taste the rewards of your work.

Susie Hassett, Science Teacher
Littleton Elementary School
PUBLIC ACCEPTANCE

In addition to the work the LCCF has done with regional agriculture, the LCCF has worked with local civic groups to increase education about biosolids treatment and soil amendments.

Southwest Florida’s soils generally consist of sands with little to no organic content. As part of this educational drive, the LCCF donates compost to projects that:
1) are operated by a 501(c)(3) organization or similar non-profits (schools),
2) submit a proposal outlining the type of project, the target audience, and the quantity of material needed for the project and
3) demonstrate an educational goal regarding gardening and self sustenance or improvement of local soils.

Some of the groups that the LCCF has partnered with include: Roots Heritage Garden (urban desert), Lehigh Edible Food Group, Heartland Gardens, Edison/Ford Winter Estates, Lee County Parks, SunCoast Community Garden, Ft Myers Women’s Shelter, Holton EcoPreserve, Women in Construction Service Project, and the Child Care Center of SW Florida as well as numerous school projects.
PUBLIC ACCEPTANCE | APPEARANCE | AESTHETICS

The LCCF staff is actively involved in the local Agricultural Extension Service’s master gardening training courses. The attendees of this course offered the most initial criticism and concern regarding biosolids use but upon discussion with LCCF staff became one of the programs biggest advocates for the recycling and reuse of organic matter in local soils.

This was achieved with full disclosure of historical testing results as well as input from soils scientists. Further, once participants understood the rigors of the LCCF’s production, quality assurance and testing programs, the stigma of biosolids compost was removed.

The efforts to increase public acceptance of the LCCF’s OrganicLee® Compost are evident in the sales data of OrganicLee® Compost since operations began in 2010. Retail sales in bulk (one cubic yard per customer) as well as bags increased from 3,200 cubic yards to almost 5,500 cubic yards between 2012 and 2013. During the same period, agricultural sales increased from 13,000 tons to 17,500 tons (approx. 26,000 and 35,000 cy, respectively).

OrganicLee® Compost was initially distributed to customers in Lee and Hendry counties through 2010 with distribution to Collier beginning in early 2011. OrganicLee® Compost is currently distributed regionally to Lee, Hendry, Collier, Sarasota, Hardee and Highlands Counties.
March 8, 2013

Solid Waste Management

Dear Keith Howard,

On behalf of the faculty, staff and the students of Alva Elementary School, we would like to request a compost donation for our flower and butterfly garden area.

Our flower and butterfly gardens are enjoyed by students, staff and parents. Students use this area to read and study the life cycle of butterflies and plant growth. Our parents relish this area in the afternoon while waiting on their children in the beautiful Florida sunshine.

We, at Alva Elementary School, appreciate your continued involvement with our school. Your generous contributions will enable our students and staff to learn, relax and enjoy our garden area for years to come.

Again, thank you for your continued support.

Sincerely,

Lynn Edward
Principal
Sent: Friday, March 09, 2012 10:58 AM  
To: Howard, Keith  
Subject: Proof of the pudding

Keith, I’m sending you a photo of my bunching onions, the larger onions are planted in Organic Lee only in the Tire garden, the others were planted at my home in potting soil! Proof of the pudding? Your product works very well.

I’d love for you to be at the Suncoast Community Garden on March 27th starting about 9 am. Home Depot is going do their installation at that time. They are planning to install irrigation, and 24 raised beds, fill them and plant them as well. I know that they have my “wish list” and truly don’t know what else they are planning. It will be a very exciting time for our garden and please bring your camera.

LOOKING FORWARD TO SEEING YOU AT THE GARDEN!

Bobbi Robertson
To Whom It May Concern:

I am the Horticulturist at the Edison & Ford Winter Estates. When Thomas Edison spent his winters in Southwest Florida he knew the importance of growing his food in what he called his truck garden. He then sold fruit and vegetables to the locals and surrounding areas out of the back of a truck. When we wanted to recreate this truck garden for demonstration purposes at our historical landscape, gardens, and museum, we knew the importance of growing in rich organic material. The organic material we chose was horse manure, ORGANICLITE COMPOST, worm castings, and sterilized crab shell. We have a garden that is 40x30 feet full of tomatoes, broccoli, cabbage, carrots, beans, peas, beets, lettuce, peppers, and radishes.

We could not have had the success without the amendments we used for our mounds. When we planted, we dropped the 9 yards of ORGANICLITE COMPOST on the top of the existing poor Florida soil (mostly sand) along with the others amendments. We proceeded to mound up rows with the organic just leaving room in between the 8 rows of planting space for maintenance between rows.

Without the compost material our tomatoes would have tasted the usual tasteless tomatoes Florida usually seems to produce. We were able to allow our employees plenty of salad material, and we were happy to sell vegetables at the Farmers Market in downtown Fort Myers.

We owe Lee County Compost team a big thank you for making their product using existing materials, and turning trash into treasure. Our vegetables thank us too.

Kind Regards,

Debbie Hughes
Horticulturist at the Edison & Ford Winter Estates