Appendix C

Organic Matter Improvement Survey Report

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Organic Matter Identification and Quantification Survey

- **Introduction**

The dairy farmers located in the Bosque River Watershed (Erath County) are working with area composters, under the direction from TCEQ, to transform their manure into compost. This effort is ensuing in an effort to alleviate surface water impairments associated with excessive levels of nitrogen and phosphorus entering the watershed. These compounds, after composting, are much less available to leaching and run off, as more complex and less soluble forms are created. Further, a goal of the composting initiative is to raise the value of the manure, allowing it to be transported out of the impacted watershed. The majority of the manure being obtained for composting, however, is low in organic matter and high in pH, calcium and sodium. The finished composts possess similar characteristics, and have a high bulk density. These characteristics make the products less desirable for TxDOT usage and more expensive to ship.

It has been determined that the addition of organic matter, especially carbon rich sources, to the dairy manure compost can modify product characteristics, thereby improving its potential marketability. This should also assist composters in producing a finished compost product that will meet TxDOT compost specifications. Meeting TxDOT compost specifications would be an obvious benefit for the compost producers in the impacted watersheds as TxDOT is currently the largest user (specifier) of compost in Texas. Unfortunately, few large sources of organic matter (or carbon rich bulking agents) have been identified locally or regionally, and those that have been identified, have been somewhat costly.

As part of its contract through Texas A&M University, R. Alexander Associates, Inc. (RAA) was tasked to conduct a survey of potential public and private sources of organic matter. The impacted compost producers have expressed concern about paying for sources of organic matter (carbon), and remaining competitive with other composters in the State. Therefore, sources of recycled materials from both the public and private sectors were sought out, as an alternative to just purchasing products like commercially available sawdust and wood chips. It was hoped that an adequate supply of 'waste' carbon could be identified which may address two existing challenges: one for the 'generator' of the carbon waste and one for the composters. Specifically, it was hoped that compost producers could find materials available for a minimal fee (cost of transportation) or even better, receive a fee for management of the 'waste' carbon.

2.0 Methods

The surveying efforts encompassed an area approximately 50 miles in diameter, with Stephenville being the central point and a radius extending an approximate distance of 25 miles in all directions. It was estimated that anything located within this circle would pose minimal transportation challenges from both expense and logistical perspectives. Potential sources of high carbon organic matter or carbon rich by-products were sought out, quantified and evaluated for economic feasibility.

Various organic by-products sought included, but were not limited to:

- Yard waste, wood waste
- Tree trimmings, wood chips
- Sawdust
- Agricultural by-products (cotton burrs, rice hulls, spoiled hay, peanut hulls)
- Paper, cardboard

RAA utilized a variety of sources to create a contact list of possible generators and/or suppliers of this carbonaceous material. These included:

- municipalities who purchased wood chippers through solid waste grant programs
- city and county recycling officials
- other municipal officials
- county agricultural agents
- city chamber of commerce business lists
- referrals from those listed above, and other sources

The survey was conducted through telephone contact, but also included E-mail contact when requested by the prospect. The project duration was approximately 4 weeks, and took place primarily during the month of August 2004. The findings of the survey are listed in this report, and in the attached spreadsheet files.

Since several composters are already purchasing a variety of bulking agents to add to their compost, we did not concentrate on identifying additional sources of material that would have to be purchased. Up to now, Erath composters have purchased sawdust, wood chips and shavings, cotton burrs and peanut hulls in an effort to increase their organic matter content and reduce their pH. These materials possess a cost ranging from $2.00 cubic yard (just the cost of delivery) to $31.00 to $55.00 cubic yard delivered. Other materials such as push down feed and spoiled hay have also been obtained, when available, typically for the cost of transportation.

2.1 Projects Tasks

Task 1: Develop contact list to utilize during organic matter material survey.
Concentrate on municipalities, major employers and manufacturers producing such by-products and supplement the list with contacts from regional cities and counties (as well as their contractors).

Task 2: Conduct survey to identify organic matter material available within the Bosque River Watershed.
Data will be uniformly collected using a standard survey form in order to obtain valuable qualitative and quantitative data. Data collection will also identify the most easily accessible organic by-product sources, volumes, their general characteristics, seasonality of generation, price/tip fee to be paid, etc. Survey will be completed through the telephone, and samples of viable by-products will be obtained for verification.

Task 3: Target specific suppliers or organic matter materials.
Criteria include specific entities, which 1) are willing to pay a tip fee for the management of these materials, thereby generating additional revenues for the composters, or 2) can provide already sized reduced material (chipped, shredded, ground), thereby offsetting any related processing costs.

3.0 Survey Findings

The prospects were all initially contacted by telephone, in relatively random order. The initial key limiting factor determining prospect viability was their distance from Stephenville. They were asked a series of questions in an attempt to; determine if they generated any organic matter rich materials, define the type of materials they generated, determine the available quantity, determine the value, if any, that they assigned to the material, and other related questions. A copy of the survey questionnaire is included in this report as **Exhibit 1**.

A mix of both public and private entities was contacted based on the list of potential generators defined above. A total of 72 prospects were defined and contacted during the survey. This consisted of 43 municipal contacts (city, county, state and federal) and 29 private industry contacts. There are two types of available sources of materials available. There are 'stockpiled' supplies, that are available immediately, and there are 'ongoing' sources available throughout the year. The stockpiled sources are the result of periods of normal by-product collection and product stockpiling that resulted primarily from the generators inability to distribute the material, and also acute stockpiling situations that resulted from heavy spring storm clean up projects in the area. Most of these materials are yard debris, such as brush and tree trimmings. The ongoing production is, as the name implies, produced on a predictable basis throughout the year. This should be a consistent source of material for the composters once they develop a business arrangement with the generator.

3.1 Material Specifications

The vast majority material identified was in the form of shredded brush, generated by municipalities. Almost no supplier could give very specific specifications other than "the material had been run through a grinder". A size range of 2- to 5-inch was given by the City of Cleburne and 4- to 6-inch by SMS Woodstone and the City of Burleson. No other producers were able to give specific size or chemical specifications.

All of the municipal producers indicated that their material had a small level of contamination that ranged from a low of 1 percent and up to 5 percent. Most reported their materials having the lesser percentage of contamination. This contamination was claimed to be primarily film plastic, resulting from the trash bags used to collect the leaves and smaller brush, but there is also likely to be an assorted collection of some larger man-made debris contained in most of the stockpiles.

3.2 Quantity

Most of the contacts could only estimate the quantity of material that currently is or will be available. They were asked to take their best, conservative guess during the survey. Some of the estimates were given in a weight (tons) estimate and others were provided in volume (cubic yards). A ratio of 2 cubic yards equals 1 ton was used to standardize results in calculating the data totals listed below. This is a conservative figure, even for yard debris which is ground and aged to some degree. Therefore, even greater volumes are likely available.

Some key supply prospects are listed below in **Figure 1** with their estimated quantities. These contacts were all passed along to the composters, TX A&M and TCEQ. In some cases, the composters were provided the contacts as soon as they were identified. This occurred when a need for urgent action was expressed by the generator of the material. The complete survey spreadsheet, with all contact information, is included in this report as **Exhibit 2**.

Stockpiled Supply – Immediate Availability	
City of Irving	5,000 cubic yards
City of Fort Worth	40,000 cubic yards
City of Cleburne	10,000 cubic yards
City of Arlington landfill	80,000 cubic yards
TOTAL	**135,000 cubic yards**

Ongoing Annual Supply	
City of Waco	12,000 cubic yards
City of Burleson	30,000 cubic yards
City of Arlington landfill	10,000 cubic yards
City of Dallas	60,000 cubic yards
City of Fort Worth	10,000 cubic yards
TXU Electric Company	75,000 cubic yards
Assorted other suppliers	21,000 cubic yards
TOTAL	**218,000 cubic yards**

Figure 1. Estimates of stockpiled and ongoing supplies of organic carbon materials near the Bosque River Watershed.

3.3 Financial Considerations

The vast majority of the municipal generators, as well as the TXU Electric Company, were more than willing to just have their material taken off their hands at no charge. It is a nuisance and a problem for them and for the most part would like to arrange a permanent and ongoing removal of it from their property. There were a few suppliers, however, who were either hinting at or asking to be paid something for the material. Some of the generators were obviously looking to offset the cost of grinding. Others may just be posturing or negotiating and will, in reality, also be satisfied to have the material removed from their sites at no charge. It will ultimately be up to the composters to negotiate the best possible arrangement. Perhaps one or more of the composters should even consider soliciting one of the larger generators for a yard debris management contract. In this scenario, they would set up a grinder at the generators location, then ship the ground product down to their Erath county location.

The City of Arlington landfill, as an example, has a supply in both categories above. They are asking $2/cubic yard for this material. This seems unusual since they appear to have a significant excess which they would like to have removed. They also claim to be selling it. Several of the producers claimed to be using part of their production locally as mulch or, in one case, as a road stabilization base. Most of the municipal producers also had established public give-away programs for their residents. None of these self-use programs, however, seemed to be absorbing the total production of a facility in any but the smallest municipal producers.

3.4 Potential Challenges

Like any business arrangement, there will always be potential challenges or barriers to implementing a new program. A list of some of these potential challenges is listed below.

3.4.1 Contamination

All of the municipal generators indicated that there was a level of contamination in their product. This consists primarily of film plastic from bags used by residents to collect and store the material. A few also indicated that some larger piece of debris (e.g. furniture pieces, auto debris, etc.) might occasionally be included in the material. If the composters were to accept this material, we assume that a waste management license may also be required.

Additionally, the risk for chemical contamination has also been addressed by some of the compost producers. Particular herbicides present in yard-wastes have been proven to persist in composted material and could pose a threat to producers who sell their material for landscape or greenhouse type uses. While this threat does not affect all uses of compost, it is difficult to test carbon material for presence of herbicide. Therefore, some compost producers are not willing to any source of 'waste' carbon.

3.4.2 Sizing

The composters should be able to receive all of the carbon rich materials after it has been shredded. There will, however, be some inconsistency in the sizes, as different generators will use different size screens on their shredding equipment. As would be expected, some of the generators actually contract out the shredding service to private contractors.

It may ultimately be advantageous for some of the composters to accept un-shredded waste to offset the cost of shredding incurred by the generators, and perhaps offer a new service to the industry. The composters would likely need to grind the materials at a site closer to where it is generated or concentrated in order to reduce ultimate transportation costs. This type of scenario would also allow the composters to have a better control of the size of the materials they obtain. This opportunity can only be determined on a case by case basis after the composters make contact with the individual generators, determine material availability and investigate the financial implications of accepting the material as shredded versus un-shredded.

3.4.3 Bidding laws

There was once a situation, with the City of Irving, where they were not permitted under City law to give material away to a private entity. They were permitted, however, to make such arrangements with either another municipality or with a state agency. These same rules exist if a City is interested in having a private firm manage their by-products for a fee. Therefore, if a composter wanted to obtain a source of material, especially with a larger community, they would likely have to go through a bidding process.

3.4.5 Truck loading

The largest, and perhaps best source of wood waste that was identified was the TXU Electric Company. They operate 20-30 small sites throughout the area in question and produce a regular supply of very clean waste wood. They typically make arrangements with private landowners to stockpile the material, but could not guarantee that there would necessarily be any equipment at these private sites to load the trucks if the composters wanted to obtain it. This situation, like all of the potential generators, will need to be specifically reviewed and addressed. The essential key is the willingness on the part of TXU to cooperate and provide the material.

3.4.6 Dumpsters

There were a couple of the private industry wood waste generators who expressed an interest in cooperating, but indicated the need for either a dumpster or a container of some kind be left at their site to collect the wood scraps and/or sawdust. This is certainly a possibility, but would also require the composters to possess a truck that can haul a roll off container.

4.0 Conclusions and Recommendations

It is the opinion of RAA that a fairly significant supply of very usable, carbon rich waste material exists within a reasonable distance of Erath County. With this said, of course, transportation costs should not be just dismissed. Regional generators should be able to assist with fulfilling both an immediate and longer term requirements of the composters. The composters would, however, need to complete the due diligence in order to assure that:

- quality of the 'waste' or by-product meets their requirements,
- specific site challenges or licensing issues can be addressed and solved,
- a mutually agreeable financial arrangement can be made, and
- the transportation logistics are mutually agreeable and cost effective.

A specific, recommended plan of action for the composters is as follows:

1. Review the attached spreadsheet and determine which generators produce the type and volume of material they require.
2. Consider transportation options and costs to determine if the location of the material is within a manageable distance.
3. Contact every supplier on the list who appears to have available material and arrange to visit the site and evaluate the material firsthand. We believe that this is critical, as opposed to just requesting a sample in the mail. It will give the best sense of product quality, site truck loading needs, material contamination, etc.
4. Concentrate on those perspective generators identified above as 'immediate' first. They may make other arrangements if the composters do not act in a timely fashion.
5. Review some of the specific challenges listed above and be prepared to address them. Some of the larger generators have presented these and they must be solved in a mutually agreeable way.
6. Make sure the composting site is prepared to accept large quantities of material in a convenient and efficient manner, so as not to hinder either the truck unloading or the composting operation activities. Consider licensing and permitting requirements. This can be easily accomplished by contacting the TCEQ.
7. Keep looking for additional sources. The composters may well find additional sources of material after they get established with the sources identified in this report.

Exhibit 1

ORGANIC BY-PRODUCTS QUESTIONNAIRE

Date:_____

1. **Company _____**
2. **Location _____**
3. **Contact/Title _____**
4. **Type(s) of Product Produced _____**
5. **Type of By-Products Generated (carbon/nitrogen based) _____**

- **Amount of By-Product Produced (tpd/ypd) _____**

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7. **By-product characteristics (particle size, pH, bulk density, OM content, WHC, moisture content, NPK). Send samples and chemical analysis.**

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8. **Tip fee paid? Price paid for? (per ton or yard, picked-up, bulk vs. bagged, sliding scale)_____**

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9. **Current distribution strategy (Major markets? Who uses? Product Literature? Advertise? Etc._____**

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10. **Other comments _____**

Exhibit 2

ORGANIC BY PRODUCT SURVEY RESULTS

Company	City	Residual	Volume	Price/Tip Fee	Current Status	Comments
City of Hewitt	Hewitt	brush chips	160 yds/yr	0	give away and compost for own use	contact him to discuss need, he is open to concept, no other city generators
City of Waco	Waco	yd debris	6000 tons/yr	0	give away and compost for own use	christianh@ci.waco.tx.us, do NOT contact hi until he has OK, Waco has lawsuit going against some dairy farmers-OK to call
City of Teague	Teague	brush chips	400 yds/yr	0	give away and compost for own use	contact him to discuss need, he is open to concept, no other city generators
City of Groesbeck	Groesbeck	brush chips	200 yds/yr	0	give away and compost for own use	contact her to discuss need, he is open to concept, city and prison also have corrugated
City of Thorton	Thorton	brush chips	??	0	just starting, will give away	this is first season with chipper, will raise issue with Council for their review
Limestone Cnty Coop. Ext.	Groesbeck	hay	n/a			very little produced, most bought
City of Marlin	Marlin	brush chips	500 yds/yr	0	none, just piling up	contact him to discuss need, he is open to concept
City of West	West	brush chips	n/a	n/a		
City of Mart	Mart	brush chips	150+ yrds/yr	0	burning most of it	contact her to arrange pick up, no other city generators
City of Lorena	Lorena	brush chips	will call back			
City of Media	Media	brush chips	not sure	0	give away and compost for own use	contact him to arrange pick up, no other city generators — would like to swap compost for chips
City of Morgan	Morgan	brush chips	none			produce a small amount which they use
City of Robinson	Robinson	brush chips	none		use and give away	nothing available
Texas Forestry Assoc.			unknown		sent e-mail with volume and timing needs	he is interested in trying to help
Cradick Lumber	Dallas		none			generate tiny quantities which they just trash
Ken Jordon Shutter Mfg.	Dallas	wood, sawdust	500 yds/yr	0	disposal	will give away to manure generators if they can provide him with a dumpster or place to keep it

Dean Foods	Dallas	none	none			
Alrtria Foods	Dallas	none	none			
Jon Lin Corp.	Marlin	onion skins	40,000#/day?			
West Pallet Co.	West	sawdust	not sure			would need to have a container placed there, creating lots of sawdust every day
TST College	West	chips	none		they use all for mulch	
Schrieber Foods	Stephenville	cardboard	6000+ #/wk	?	baling and disposing?	He will look into the possibility of giving it to our people, they will be expanding and have more in future
Fibergrate Composite Structures	Stephenville	cardboard	? Tons/yr	?	baling and recycling?	He will look into the possibility of giving it to our people, but he thinks that they receive $$ for it now
Lone Star Corrugated	Irving	cardboard	none		baling and recycling	getting paid for cardboard
Erath County Coop. Ext.	Stephenville	hay	none			very erratic, undependable supply, IF at all
Thelin Recycling	Ft. Worth		none			mortal ENEMY of Erath dairy guys
City of Benbrook	Benbrook		none			small residential community with no sources that she is aware of
City of Arlington	Arlington		none			
Arlington Landfill	Arlington	ground brush	80,000 yds now, 10,000/yr	$2/yd asking price	claims to be selling	has large stockpile now, and annual supply, he wants to sell it
City of Burleson	Burleson	brush & compost	about 30,000 yds/yr			city makes and gives away yd trimming compost but has surplus, contractor grinds and removes
SMS Woodstone	Burleson		LOTS			
SMS Woodstone	Burleson	brush	LOTS	0	mostly give away to variety of users	wood grinding company @$.30-$1.70/yd to grind, grind about 3.75MM yds/yr
City of Cleburne	Cleburne	brush	10,000 yds now	0	resident giveaway	double grinds for resident giveaway now, has large stockpile of larger material on site and available
City of Cross Plains	Cross Plains		none			
Potter Game Tables	Cross Plains	sawdust & scraps	15 yds,yr+	0	disposal	has both sawdust and undefined quantity of natural wood scraps from furniture business

City of Dallas	Dallas		maybe at landfill			
City of Duncanville	Duncanville	brush+	avg. 80 yds/wk	0	resident giveaway and living earth tech.	also 2 cabinet makers in town with large waste wood supply, send him an e-mail and he will coordinate
City of Euless	Euless		none			
Dallas City landfill	Rick White	brush & chips	70,000 tons/yr	pay $0.93/yd to grind	use for road stabilization	would probably only offer unground waste, contains about 5% inerts
Trinity Waste	Randy Shiflet	6 landfills	None, EXCEPT contaminated			lots of waste BUT NO source separation in Texas, ALL waste is co-mingled MSW
Council of Governments	Mary Neutz		none			thinks we are on right track and has no easier, faster way to go about carbon search
City of Ft. Worth	Ft. Worth	yd waste & brush	20,000 tons++	0	some giveaway, ed.shumpert@fortworthgov.org	has 20,000 tons, ground and available NOW from a storm clean up, has 100 tons/wk year around
Abitibi Paper	Ft. Worth					handles all paper recycling for Ft. Worth
Supreme Corp.	Cleburne	cardboard?	Call 8/16			
Dr. Pepper	Dublin					
TX Institute of Applied Env. Res.	Stephenville	see EPA	none		beran@tiaer.tarleton.edu	
Trinity River Authority			No Waste or Info.			
TXU Electric Delivery Company	various	chips	300++/day	0	giving away, disposal	has been contacted by Paul Fagan from Organic Reclamation (STA member) and trying to work with him, have 20-30 private locations that they store chips at, NO loading ability unless private sites can do
City of Granbury	Granbury					
City of Grand Prairie	Grand Prairie					
City of Irving	Irving		left message			
City of N. Richland Hills	N. Richland Hills		left message			

City of Stephenville	Stephenville	yd waste & brush	2 tls/wk	0	used to giveaway to composter who went out of business	pay to have it ground about 1/yr, pretty clean, open to connecting with manure folks
City of Waxachie	Waxachie					
City of Weatherford	Weatherford	brush	350 yds/yr	0	local giveaway	would be interested in Erath project
Hamilton County Recycling	Hamilton		left message			
Central Texas Corrugated		corrugated	left message			
EPA Region 6	Dallas		left message			