Assistance in the Development of an Information Resource on Compost Facility Training for Region 5 States and Operators

FINAL REPORT, TASK 01-06

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1.0 Introduction

Under the Resource Conservation and Recovery Act (RCRA) Enforcement, Permitting, and Assistance Contract (REPA) 5, Contract Number EP-W-12-032, Task Order 5524.001, the U.S. Environmental Protection Agency (EPA) tasked Toeroek Associates, Inc. (Toeroek) to assist EPA in developing an information resource on compost facility training needs and opportunities in Region 5 states. This report:

- Summarizes current Region 5 state regulations relating to food scrap composting and requirements for operator training;
- Identifies and describes key components of compost training resources available to Region 5 state agency personnel and compost operators, especially those that accept food waste;
- Provides a summary of interviews with Region 5 compost operators regarding their experiences with available operator training; and
- Identifies key components that address the compost operational issues faced in Region 5.

This report contains seven sections. Section 1.0 introduces the scope of work and outlines the sections of the report. Section 2.0 provides a summary of compost regulatory requirements for Region 5 states and one state from each of the other EPA regions. Section 3.0 compiles compost operator training courses available to Region 5 operators. Section 4.0 summarizes findings from interviews held with Region 5 compost operators, who were identified by EPA Region 5 through their state agency contacts. Section 5.0 provides an analysis of additional issues faced by the compost operators; the issues fall outside of the scope of training programs but were identified in initial interviews with compost operators. Section 6.0 provides a summary of the work performed under this task order, identifies gaps in training that have yet to be addressed, and provides recommendations. Section 7.0 acknowledges the individuals and organizations that contributed to this report.

To support research efforts, references, interview summaries and other supporting documentation were collected and compiled for EPA's records. The records are presented in Appendices A through D, with documents collected for the Summary of Regulatory Requirements presented in Appendix A, the Summary of Compost Operator Training presented in Appendix B, the Summary of Food Scrap Composter Interviews compiled in Appendix C, and Follow-up Interviews presented in Appendix D. The appendices are provided on an electronic disc. The reference documents are identified with a sequential naming format, where the references are numbered sequentially within the appendix in which it is found based on the order in which it was collected. A complete reference, for example, is cited as Ref. A-1, which indicates that it is the first reference for the Summary of Regulatory Requirements, which is found in Appendix A.

2.0 State Regulatory Requirements Findings

EPA tasked Toeroek to update a working spreadsheet provided by EPA, entitled Task 1 – State Compost Operations. EPA requested Toeroek to focus its research efforts on Region 5 states and one additional state in the remaining nine EPA regions. The updated table is provided as Attachment 1 –State Regulations Summary Table, which lists each state included in the research of state regulatory regulations. Regulatory information for each state is summarized for the following areas:

- Composting methods;
- Odor control;
- Time until incorporation;
- Temperature/turnings and pathogens;
- Minimum composting/curing time;
- Waste disposal;
- Noise/dust;
- Storage time;
- Recordkeeping/reporting;
- Other operational requirements; and
- Training requirements.

Toeroek focused on regulations pertaining to operator training requirements, but other regulatory concerns such as odor control were also included in the summary table. We also added available links to state statutes and/or regulations for the Region 5 states to the summary table. Electronic copies of state regulations and statutes are found in Appendix A.

Toeroek collected information regarding compost regulations for each state through the US Composting Council's website (http://compostingcouncil.org/state-compost-regulations-map/), additional Google queries and through individual state registers. Additionally, we interviewed representatives of state regulatory agencies for each Region 5 state to confirm the regulatory findings presented for the Region 5 states. Representatives from the following state organizations were contacted:

- Indiana Department of Environmental Management (IDEM);
- Illinois Environmental Protection Agency (Illinois EPA);
- Minnesota Pollution Control Agency (MPCA);
- Ohio Environmental Protection Agency (Ohio EPA);
- Wisconsin Department of Natural Resources (WDNR); and
- Michigan Department of Environmental Quality (MDEQ).

Toeroek also interviewed representatives of Minnesota Composting Council and U.S. Composting Council. These representatives were also interviewed to confirm Toeroek's understand of the state regulations.

2.1 Summary of Findings

The findings from Toeroek's review of Region 5 state regulations and interviews with representatives of state environmental programs are presented below.

2.1.1 Summary of Regulations

Toeroek reviewed state statutes and regulations to determine whether compost operator training is required by the state and if so, whether the requirements are specific to the management of food scrap wastes. Following the format of a draft summary of regulations table provided by EPA, the state's training requirements were described as either no requirement specified, or general training

requirements. None of the states researched for this regulatory review identified training requirements that were specific to the management of food scrap waste. Table 1 highlights some of the findings for the Region 5 states.

Table 1: Region 5 State Compost Regulation Summary

State	Composting Regulations and Training Requirements
Illinois	• 35 Illinois Administrative Code (IAC) Section 830 and 832 pertain to landscape composting; landscaping waste mixed with additives, other than water, up to 5-10% by volume is still regulated under 830 and 832. • 35 IAC Section 830.210 describes training for permitted landscape waste compost facilities: the operator must provide training to all personnel and personnel must sign an acknowledgement stating training has been received. According to Illinois EPA representative, this training requirement is considered site specific, does not require external training, and may be satisfied by on the job training. • Illinois EPA does not provide compost operator training and cannot recommend courses. • The Illinois EPA representative indicated that there has been some discussion to address operator training in regulatory requirements but no changes are planned for the immediate future.
Indiana	• Regulations are written for landscape composting only. The regulations do not apply to composting operations at a residence or farm that compost vegetative matter (VM) or other types of organic material, composting operations that process less than 2,000 pounds of VM during a year, and temporary stores of VM where only incidental amounts of composting occur before removal. • Composts facilities must register with IDEM by submitting an application that outlines the location and operational plans for the facility. The location of the facility is restricted depending on the hydrology of the area. Additionally, the operators of the facility must have controls in place for noise, dust and odor. • No compost operator training is required. • No compost operator training is provided.
Michigan	• Composting regulations apply to landscaping waste only (referred to as landscaping). • Food scraps are categorized as garbage unless they fall under the farm scrap exception Section 11506(1)(h)(i). • There are no training requirements for composting operators. • MDEQ offers a one-day workshop geared towards composting operator beginners. • According to a Michigan composting operator, there are two potential areas of regulatory revisions under consideration: o Grass may be sent back into landfills.

State	Composting Regulations and Training Requirements
	○ Potential to increase MDEQ's role as a licensor and inspector of composting facilities.
Minnesota	• New legislation effective December 22, 2014, specifically addresses source separated organic wastes (SSOW); food scraps fall under SSOW. • The new regulations also address small site composting (120 cubic yards maximum). No training is required for small scale operations. • Food scraps composting may still be addressed under the previous rules for municipal solid waste (MSW). • Personnel training is required for composting facilities. These training courses must address safety concerns, groundwater contamination, and general operations. All SSOW compost facility operators are required to have 24 contact training hours initially and five hours annually thereafter for continuing education. • Courses must be approved by the Commissioner to satisfy the personnel training requirement, although no certification program has been developed. • The required 24 contact hours can be met by: ○ Attending the annual Midwest Composting School training. This three-day training is held at a different Midwestern city each year. ○ Attending US Composting Council training courses.
Ohio	• The owner or operator of a composting facility must ensure a certified operator is in charge of the operation and maintenance of the composting facility. The Certified operator must be trained per Chapter 3734 of the Revised Code. • Regulations indicate specific composting operator training, but Ohio EPA has not established a certified training course yet. • According to an Ohio EPA representative, Ohio EPA is organizing a work group to address issues that are specific to food scrap composting (Class II facilities). • The Ohio State University Extension offers a comprehensive, two-day course that includes the science of composting, lab exercises, and general discussion of feedstock.
Wisconsin	• Composting regulations apply to food scraps as well as yard, farm, source separated compostable materials. There are no training requirements for composting operators of any feedstock (does not apply to biosolids).

2.1.2 Summary of Region 5 State Agency Interviews

Toeroek held interviews with representatives from state regulatory agencies for the Region 5 states between March 12 and April 29, 2015. The interviews were held to confirm and clarify Toeroek's understanding of regulations relative to training requirements, and discuss any potential upcoming changes to the regulations. Representatives of the state agencies confirmed our understanding that

there is no compost operator training requirement in Illinois[1], Indiana, Michigan, and Wisconsin. In Illinois, the state agency representative indicated that some at Illinois EPA may support revision of the legislation to address training requirements, but there has been no recent progress on this issue (Ref.A-22). Minnesota and Ohio require a certain degree of operator training as discussed below.

Minnesota regulations require compost facilities to institute a personnel training program that addresses state composting operation regulations (Ref. A-14). MPCA also requires operators at SSOW facilities to initially complete a 24-hour training program and five hours of annual training in subsequent years, but the training requirement is not specific to food scrap waste. The 24-hour training may be met through workshops provided by the Midwest Composting School or the U.S. Composting Council, both of which are held on a yearly basis at multiple locations. The MPCA does not currently have a list of courses that counts towards the annual five-hour annual course requirement; however, the MPCA representative stated they are working on a list and courses sponsored by the Minnesota Composting Council or nearby state colleges and universities may be completed to fulfill the requirement. MPCA is considering recognizing webinars as a means to fulfill the requirement; but to date, MPCA has not developed a system by which the training courses can be evaluated and approved to meet state training requirements (Ref. A-22, Ref. A-24).

Ohio regulations stipulate that a composting facility must be owned or operated by a certified operator, and that operators must be trained to meet state regulations (Ref. A-6). The Ohio EPA representative stated that training is a requirement to certify operators, but no certification course is currently offered by the state of Ohio. Ohio EPA is currently organizing a work group that will focus on implementing certified operator training and providing technical assistance to facilities that accept food scraps as a feedstock (Ref. A-22).

Several state agency contacts confirmed that general training courses likely incorporate information to address food scrap wastes in their general topics; for example, the MPCA representative confirmed that an eight-hour session of the U.S. Composting Council course regarding feedstock management included relevant food scrap management issues and techniques (Ref. A-22).

2.1.3 Additional Findings

This section summarizes additional findings about composting operations, how operations are regulated, and what regulatory changes may come about in the future. IDEM and MDEQ representatives indicated that compost regulations are written for landscape waste only. In Michigan, food scraps are categorized as garbage unless they fall under a farm scrap exemption (Ref. A-22).

In Michigan, there is discussion of changes to Enrolled Senate Bill No. 513, Section 11521, Subsection 1, regulation in the near future with regard to the composting industry. Currently, landfills may not accept landscape waste; however, some composters have accumulated large stockpiles of landscape waste and the supply of landscape waste exceeds the demand for its use. The waste management industry is lobbying for regulation change that allows landscape waste to be sent to landfills. Secondly, there is a

[1] Under 830.210, the "operator" must know how to compost and how their specific operation is to run. External training, such as training courses or workshops, is not required. On the job training may satisfy this requirement.

push by landfill lobby groups to increase MDEQ's role as a licensor and inspector of composting facilities. According to a MDEQ representative, these topics have come up for discussion in the legislature multiple times within the last ten years (Ref. A-22).

2.2 Issues and Concerns

Each of the Region 5 states has a similar set of challenges with regard to the regulation and development of compost operator training programs. Ohio and Minnesota share similar concerns in that training is required for compost operators, but a validation system to ensure the course meets the state requirement has not yet been fully established, the required courses are not currently available in the states, and there is no means to evaluate out-of-state courses or track operator participation. States that may be considering instituting a training requirement, like Illinois, will have similar concerns to resolve.

3.0 Compost Operator Training Courses

EPA tasked Toeroek to identify compost operator training programs that are available and accessible to individuals located in the Region 5 states. While additional training programs outside of the Region 5 states exist and some are included in the discussion below, this research was not intended to be a comprehensive list of all available training courses in the United States. The research focused on operator training programs that are reasonably accessible and that generally focus on issues and concerns facing operators in Region 5 states.

Toeroek researched available compost operator training programs through:

- Interviewing training providers;
- Interviewing state regulatory program representatives;
- Researching online state agency and composting organizations' websites; and
- Contacting course providers via email and over the phone for more information.

Toeroek interviewed state regulatory agency representatives and educational leaders from the Midwest Composting School, Minnesota Composting Council and the US Composting Council to gather information about available courses and course content. Information collected on training courses is summarized in Attachment 2, the Compost Operator Training Summary Table.

When available, Toeroek obtained a syllabus or course description for identified courses, and in some cases course providers provided copies of the course presentation. The collected references are presented in Appendix B.

3.1 Summary of Findings

Attachment 2 identifies training opportunities (course, workshop, webinar) and summarizes information gathered for each training course for the following fields:

- Training course name;
- Provider;
- Frequency offered;

- Date of the most recent training or next offered date, if available;
- Location;
- Estimated costs;
- Food scrap composting topics addressed;
- Course length;
- Course description;
- Continuing education credit offered;
- Comments; and
- Web links and/or references.

Further, Toeroek identified ten topics relating to compost facility operations, which are also relevant to food scrap composting operations. The topics were identified through Internet research, review of regulatory requirements, and discussions with training provider representatives and EPA. We then reviewed available information regarding the courses, either by obtaining training syllabi, reviewing course promotional materials or conducting interviews to determine, if possible, whether the identified courses addressed these topics. The training topics include:

- Odor control;
- Leachate management;
- Best Management Practices (BMPs);
- Target moisture;
- Target porosity;
- Compost sampling;
- Fire suppression;
- Carbon to nitrogen (C:N) ratio;
- Pathogen control; and
- Cold weather composting.

Toeroek identified 25 different training offerings presented by 17 organizations, which vary in format, content, and length. The training opportunities include multi-day classroom and field courses, brief webinars, and multi-day conferences. According to training providers and participants, the advantage of the longer, multi-day training courses provide the opportunity for hands-on or field training, while webinars are best suited to tackle shorter, more discrete topics. Training costs vary from free to more than $1,000. As expected, courses that have a classroom component are generally more costly than webinars. Fifteen of the courses are offered in the Region 5 states or adjacent states or are available online, and ten are offered outside of Region 5 and adjacent states. Table 2 breaks down the number of courses from the 25 training opportunities evaluated that cover each of the identified topics. Five of the training courses evaluated either did not have any information available about the topics that were covered, or the topics change each time the training event is offered.

Table 2: Summary of Topics Covered by Courses

Operational Topics	Number of Courses Covering Topic
Odor Control	17
Leachate Management	12
Best Management Practices	20
Achieving Target Moisture	13
Achieving Target Porosity	10
Compost Sampling Methodology	12
Fire Suppression	7
Carbon to Nitrogen Ratio	13
Pathogen Control	6
Temperature Control	9
Cold Weather Composting	1

Additional training information from previously offered courses was provided for this report by Ms. Ginny Black of the Minnesota Composting Council. This training information is from 2003 and 2009 and is included as Ref. B-32 through Ref. B-53 in Appendix B. The training material provides an overview of a broad range of topics that relate to the composting industry and provides examples of materials typically covered in general compost operator training. The following topics were covered in the provided training material:

- Basic composting concepts;
- Biology of composting;
- Field exercises;
- Stormwater quality and retention;
- Erosion/sediment control;
- Sample collection from compost piles;
- Regulatory requirements;
- Benefits, uses and markets for compost;
- Physical modeling of the composting environment;
- Troubleshooting;
- Laboratory analyses;
- End use quality;
- Composting technologies;
- Compost engineering design; and
- Environmental impacts of compost application on construction sites.

3.2 Issues and Concerns

In Toeroek's research and discussions with individuals in the compost education industry, individuals from state regulatory agencies, and compost operators, several issues were noted that may represent areas of potential improvement for training program coordinators and state regulators. These include:

- There is no system for course validation by Region 5 states with training requirements (Minnesota and Ohio). For example, Minnesota does not currently evaluate training courses to ensure they meet the state's requirements for the initial 24-hour training requirement or the 5 hours of annual continuing education, although they have stated the Midwest Composting School or US Composting Council annual courses are acceptable. Compost operators may be more willing to participate in training if they are certain their costs and time will be expended for a course that will meet the state training requirements.
- No Region 5 state offers a list of available or approved training courses. An example of a useful listing of approved compost operator training programs is provided at the State of Vermont's Department of Environmental Conservation website http://www.anr.state.vt.us/dec/wastediv/solid/documents/ApprovedTraining.pdf. The list identifies upcoming courses that if completed, will meet Vermont requirements. A copy of this listing is found at Ref B-54.
- Region 5 states that require training have varied regulatory requirements toward the tracking of participation in operator training courses (i.e., requiring the facilities to keep records, or track by agency). One state, outside of Region5, that does have a program is Iowa: compost operators are required to take a Compost Operators Training Course and then complete and return the Compost Facility Operator Application to the Department of Natural Resources. The trainee must also include proof that the required course was completed.
    - Ohio EPA does not regulate the tracking of compost operator training fulfillment (Ref. A-6 and Ref. A-23);
    - MCPA must submit a personnel training program plan to the commissioner of the MCPA, and include the training and experience qualifications of individuals who collect compost samples (Ref. A-14); and
    - Illinois EPA requires that compost operators maintain a record all personnel trained at their facility, the record must include a signed acknowledgement from personnel of the training they have received (Ref. A-2).
- Based on interviews and review of the current training options, courses that are provided for national audiences may not address some of the concerns that apply only to operators in similar geographic and climatic regions of the country. In addition, regional courses may address some of operational practices that are unique to a certain geographic area, such as seasonal changes in temperature, water and feedstock availability but may not address individual state regulations adequately.
- Some composting operators expressed disappointment that available courses were targeted to large, municipal sites while other operators thought the course content was too basic, and designed for small, first time operators. Operators may benefit from attending courses that are specific to concerns they face at their facility, rather than a "one size fits all" approach.
- Several operators expressed that networking with other attendees at the course served to be more educational than some course presentations. Some operators expressed the view that course presenters were reluctant to share trade secrets.

4.0 Food Scrap Compost Operator Interviews

EPA requested that Toeroek interview compost operators regarding operations at their facility and their perceptions of previously attended operator training courses. EPA provided a list of nine Region 5 operators that would potentially be willing to participate in this study. The interviews specifically addressed the course accessibility, content and quality of available training programs and the application of information received at training courses to daily operations at their facility.

Toeroek initially reached out to potential participants through a phone call and a subsequent email that provided an overview of the purpose of and expectations for the interview. Six of the nine individuals agreed to participate and were emailed an interview guide to help them prepare for the call (Ref. C-7). Interviews were conducted by telephone from June 1, to June 15, 2015.

4.1 Summary of Findings

Summaries of the interviewee responses are provided as References C-1 through C-6, as indicated in Table 3 - Overview of Facilities Represented in Interviews. The facilities are located in four of the six Region 5 states (Illinois, Michigan, Minnesota and Wisconsin), and represent small, farm-based operations as well as urban corporate facilities. The interviewees were all senior managers or owners of their facilities, with many years of experience. All facilities represented by the participants have been in operation for over a decade, and all currently accept food scraps as feedstock. The food scraps feedstock comes from various sources depending on the nature of each facility's operations. The sources included grocery stores, restaurants, cafeterias, breweries, and food processing facilities as well as residential collection of food scraps commingled with yard wastes.

Table 1: Overview of Facilities Represented in Interviews

Facility ID	Facility Location	Approx. Years of Operation/Years Accepting Food Waste	Size of Facility	Food Scrap Contribution	Reference
Facility 1	Belleville, IL	19 / 4 - 5	45 acres	Up to 20%	C-1
Facility 2	Wausau, WI	20 – 21 / 3	15 acres	Less than 5%	C-2
Facility 3	Ann Arbor, MI	25 / 1.5	28 acres	10%	C-3
Facility 4	South Lyon, MI	21 / 7	16 acres	16.5%	C-4
Facility 5	Grand Rapids, MI	15 / 6	50 acres	20-23%	C-5
Facility 6	Duluth, MN	14 / 14	7,900 tons[2]	40%	C-6

4.1.1 Operating Concerns

Table 4 - Summary of Primary Operating Concerns summarizes interviewee responses regarding their primary operating concerns. This information is useful in validating existing training topics and the identification of additional training needs discussed more fully in Section 4.1.2. The interviewees

[2] Interviewee responded with tons of compost accepted each month, rather than acreage; they were subsequently not available for comment on facility acreage.

indicated that odor control is the most commonly reported operating concern with four separate facilities describing this issue. While this was the most widely reported issue, respondents indicated that they were readily able to manage the problem and the significance of the issue is often related to site location (distance to nearest neighbors). Separating non-biodegradable contaminants, such as glass and plastic, is the second most common operating concern, with three facilities reporting this topic of concern. This issue seemed to be a less manageable nuisance for operators, and is typically addressed through the use of equipment that helps separate out contaminants, and through education of the feedstock supplier.

A total of two facilities reported the following primary operating concerns: standing water and leachate management, scavenging wildlife, finding transporters of feedstock, and litter and blowing trash. The least reported issues in this survey were challenges incorporating feedstock during cold winter months and managing a compost facility with limited space.

Table 2: Summary of Primary Operating Concerns

Operational Concerns	Facility 1	Facility 2	Facility 3	Facility 4	Facility 5	Facility 6	Total Facilities
Odor Control	x	x		x		x	4
Separating Non-Biodegradable Contaminants	x		x			x	3
Standing Water and Leaching	x				x		2
Wildlife Scavengers	x				x		2
Finding Transporters to Bring Waste to Facility				x		x	2
Litter and Blowing Trash				x		x	2
Temperature Challenges in Winter Months		x					1
Limited Space						x	1

All of the participants were asked if internal inspection checklists were used to manage their facility. Two operators reported that their facility utilizes an internal inspection checklist in the management of their facility. One operator then provided a copy of the checklist, which is included as Ref. C-8. The checklist includes a compliance/inspection checklist, as well as a daily log to document:

- Weather condition;
- Temperatures and oxygen reading;
- Organics receipts;
- Equipment inspections;
- Site maintenance;
- Windrow work; and

- Compost sampling.

4.1.2 Training Comments and Concerns

Five out of the six interviewees have participated in at least one compost operator training course. Participants were asked questions about what they would like to see at training courses in general, and more specific questions regarding training courses they have already attended. The interview questions and summary of the responses are broken down into two categories: general questions regarding overall views on operator training (Table 5), and specific questions regarding three training courses attended (Table 6).

General Training Questions

The interview responses regarding general training questions are summarized in Table 5. The responses for all participants have been grouped together by question.

Table 3: Summary of General Training Questions

Question:	Answers:
What training topics are most relevant to food scrap composting?	• Sampling methodology, for feedstock, compost and end product (Ref. C-1) • Discussion of experiences and lessons learned by networking with other attendees (Ref. C-1) • The science of why and how composting works (Ref. C-3) • Clear-cut guidance of what are good sources of carbon and nitrogen (Ref. C-4) • Moisture level control (Ref. C-4) • Training to specific state regulations (Ref. C-6) • Coverage of composting in its entirety and characteristics of food waste in the decomposition process (Ref. C-6) • Collection and transportation of food scraps (Ref. C-6)
What topics would you most like to see covered in a training course?	• Broad training topics to address everything from start-up to finished products (Ref. C-1) • An overview of styles of equipment used in the composting industry (Ref. C-2) • Composting basics (the why and how) (Ref. C-3) • Methods of composting without a cement pad to prevent leaching and methods of controlling blowing trash (Ref. C-4) • Permitting and funding (Ref. C-6) • Practical compost processing for low-tech, small facilities (Ref. C-6)
How did you apply what you learned at training to operations at your facility?	• Utilized improved testing procedures (Ref. C-1) • Applied better methodology for dealing with pests (Ref. C-1)

Question:	Answers:
	• Utilized recipes for good composting (Ref. C-3) • Applied better understanding of the seasonal variability of composting (Ref. C-3) • Shared course literature with staff at their facility for educational purposes (Ref. C-6)
What is the most effective method of training?	• Classroom where participation is encouraged (Ref. C-1; Ref. C-2; Ref. C-3; Ref. C-4; Ref. C-6) • Text and reference materials (Ref. C-3) • Networking (Ref. C-1; Ref. C-4; Ref. C-5; Ref. C-6)
Would you send your lower level employees to operator training? (one participant was not asked this question as it was developed after the interview process began)	• Yes, if training looked like it would improve operations at the facility and if it were affordable based on the company's budget (Ref. C-2; Ref. C-6). • Yes, many of the participants already send their lower level employees to operator training courses (Ref. C-3; Ref. C-4). • No, lower-level employee turnover rate is high, and therefore would not be cost effective (Ref. C-5). • Yes, if it was warranted, but if you hire the right person, it is not difficult to train employee on site (Ref. C-1)

Specific Training Questions

Interview responses regarding questions asked about specific training courses that were attended by interviewees are summarized in Table 6. The interviewees had attended three separate training courses offered over recent years: the US Composting Councils Compost Operator Training Course, the MDEQ's Michigan Operator Course, and the Midwest Composting School. Interviewees were asked about the most valuable and least valuable components of training and specific questions regarding topics that were covered. In each column for specific topics coverage, a total is provided for the number of interviewees that indicated the topic was covered in the course on some level.

Table 6: Summary of Attended Training

Provider: Course Name	Most Valuable Component of Training	Topics Missing from Training	Number of Interviewees Attended	What topics were covered?									
				Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
U.S. Composting Council: Compost Operator Training Course	• Receiving instruction on testing protocols (Ref. C-1) • Networking (Ref. C-5)	• Feedstock recipes were not provided for large scale composting (Ref. C-1) • More practical, in-depth training from non-competitors (Ref. C-5)	2	2	2	2	2	1	2	1	2	2	0
MDEQ: Michigan Operator Workshop	• Health and Safety Coverage (Ref. C-3) • Networking (Ref. C-4; Ref. C-5)	• Hands-on experience for composting equipment and mechanics (Ref. C-3) • More free time for networking and practical information about accepting food scraps (Ref. C-4) • More practical, in-depth training from non-competitors (Ref. C-5)	3	3	3	3	2	2	3	1	3	2	2
Midwest Composting School	• Networking (Ref. C-6)[3]	• No response (Ref. C-6)[1]	1										

[3] Respondent stated that topics change every year, and couldn't recall what specific topics were covered (Ref. C-6).

Table 6: Summary of Attended Training

4.1.3 Additional Training Resources

On the job training (OJT) was identified as an important means of employee training, especially by facilities that experience high turnover (Ref. C-6). While some operators acknowledged OJT was informal, other interviewees reported more formal programs. For example, one company holds weekly "Toolbox" meetings with all employees to discuss safety, new techniques and operational issues as a means to provide OJT (Ref. C-1). Another interviewee reported that his company sponsors an annual training workshop, which is incorporated into a corporate meeting. Approximately 50% of the meeting is devoted to operations (training) while the remainder is marketing and business issues (Ref. C-3).

A few of the participants identified reference books that they have found to be valuable training resources. These books include:

- *Compost Operations Guide: Best Management Practices for Commercial Site Compost Operations* (Ref. C-3; Ref. C-4). A hyperlink to the Compost Operations Guide is posted on the MDEQ website (http://www.michigan.gov/documents/deq/deq-oea-compostoperatorguidebook_488399_7.pdf).
- *On-Farm Composting Handbook*. This book is available for purchase from Plant and Life Sciences Publishing, for $25.00 (Ref. C-9).

4.2 Issues and Concerns

Throughout the interview process participants identified the most important components of training opportunities or brought up a number of areas for potential improvement in training, including:

- Target subject material to meet audience needs. This may be difficult because of the range in types, size, and experience level of facilities, but this could be met through breakout sessions or work groups (Ref. C-3). While some interviewees felt separate courses should be provided to meet the specific target audience, others felt there was value in the networking opportunity from a mixed audience.
- Provide training opportunities that can promote networking (Ref. C-1, Ref. C-2, Ref. C-4, Ref. C-5, Ref. C-6).
- Provide trainers who have hands-on experience but are willing to share information rather than protect trade secrets (Ref. C-2, Ref. C-3, and Ref. C-5).
- Address state-specific regulations in training, including permitting requirements (Ref. C-6).

5.0 Follow-Up Interviews

As previously stated, Toeroek interviewed six compost facility operators and/or owners. During the interviews, some of the compost operators described additional issues that they face that fall outside of the interviews' main focus of training in the composting industry. This section seeks to further expand upon the information captured in the initial interviews by defining the concerns and the magnitude of their impact on individual operators and on the composting industry in general.

Table 6: Summary of Attended Training

Information captured from the initial interviews was summarized, focusing specifically on areas of concern for individuals working in the composting industry. The identified issues were consolidated into three main topics: feedstock concerns, transportation issues, and standardized regulation for variable sized operations. Potential solutions were also identified for each concern. Toeroek crafted questions that were designed to further investigate these topics, particularly how prevalent the issues are, to what degree they affect operations and to understand what solutions may exist to overcome these obstacles. Toeroek re-contacted the six participants via email to request a second interview. Of the six original participants, three individuals were available to participate in a follow-up interview; the remaining three either declined or did not respond. Toeroek provided an interview guide to the participants prior to the time of the interview. Toeroek summarized the results of the interview in the following sections of this report.

5.1 Summary of Findings

Each topic is discussed below, as a compilation of the information gathered from the respondents during interviews conducted August 19 through August 24, 2015.

5.1.1 Feedstock Concerns

General Variability in Feedstock Quality

All responding compost operators confirmed that there is variation in the quality of feedstock they receive; however, this variation is not unexpected and does not tend to have a significant impact on their operations. Food scrap wastes can be more variable (i.e., too wet), but often variation is the result of seasonal or weather conditions. The variation impacts some operations more than others; food scraps wastes that are mixed at the curbside with yard wastes tend to be more consistent than post-consumer third party food scrap wastes (i.e., that picked up from grocery stores or restaurants). The respondents stated it is part of the business and awareness of the quality of feedstock is an important part of the operations. As operators, they are generally able to manage the variability in feedstock such that they do not believe redefinition of acceptable materials is needed (Ref. D-1; Ref. D-2; Ref. D-3).

Solutions to the operational issues resulting from variability include operational adjustments, such as the use of irrigation ponds or other means to water materials that are too dry, or the addition of drier feedstock to address materials that are too wet (Ref. D-2). Feedstock problems most commonly occur with new customers, with the respondents resolving this concern through educating the suppliers (Ref. D-1, Ref. D-3).

Plastics or Other Non-degradable Contaminants in Feed Stock

Plastics, glass and non-compostable materials, such as railroad ties and tree stumps, were reported as the most common non-compostable contaminants at the compost facility. Plastics are the biggest concern in food scrap wastes from sources such as grocers. One facility estimates that 75% of the contaminants are packaging from foodstuffs (Ref. D-1), while two others indicated their biggest problem currently is the identification stickers applied to fruits and vegetables at the grocers (i.e., the labels that identify the specific charge code for the respective produce). Although small, typically about one-half

inch in size, these stickers do not decompose and cannot be captured and removed by any equipment (Ref. D-1 and Ref. D-2).

Solutions for the prevention or management of non-compostable contaminants vary by type of facility, with an important factor being education of the suppliers at the front end of the process. For example, one facility utilizes a "Feedstock Coordinator," who interfaces with the feedstock providers and the compost facility staff to define and monitor acceptable feedstock. If problems are identified in a shipment, the Feedstock Coordinator communicates with the provider to educate them and ensure that they understand what the problems are so that they will not continue to happen (Ref. D-1). Another facility, which allows suppliers to drop off wastes at their site, posts warning signs to educate suppliers on the quality required for acceptable feedstock. They have found other contractors bringing feedstock to the yard help to voluntarily "police" the drop-off area to ensure the site remains open and accessible to them (Ref. D-2).

For materials picked up in a residential curbside pick-up program, the respondent reports that the haulers are trained to identify problems and will not pick up the bins if they see non-compostable contamination, such as plastic or glass in the bins. The haulers place a note on the bin to inform the residents why it is not picked up. One respondent indicated that in Ann Arbor, Michigan, there is an active, on-going public awareness program to educate the residents on the City of Ann Arbor's website. The city hosts an educational composting webpage that provides general guidelines to identify acceptable materials. The respondent states that this education program has been effective and their feedstocks are relatively free of non-compostable contamination (Ref. D-3).

Process equipment is utilized to clean-out the contaminants at the back end of the process if the contaminants have entered the process, or contaminants may be required to be removed manually. One facility has recently purchased a depackaging machine to be used at their site. If suppliers choose to provide feedstock in plastic packaging, they will use the depackaging machine to separate out the plastics. This facility also utilizes specialized equipment (called a "Hurricane") to aid in plastics removal (Ref. D-1). Another facility reports that they utilize a slow speed shredder at the back end of their process, which allows easier manual removal of the non-compostable contaminants (Ref. D-3). Whether separated out by mechanical or manual methods, the additional cost to send the non-compostable contaminants to a landfill will be passed on to the supplier. Alternatively, if the feedstock brought to a facility by a food scrap generator is found to be unacceptable, the generator may be asked to return to the compost facility to retrieve the materials (Ref. D-1).

When asked if compostable plastics would help to resolve this issue, the answers were somewhat mixed. For the primary concern reported, that of the non-biodegradable produce identification stickers, it would help to utilize compostable plastics. The stickers are too small to be removed mechanical or manually, and are ending up in product. Therefore, the respondents conclude that use of biodegradable material is the best solution, if a cost-effective material can be developed. Similarly, the use of compostable bags for feedstock collection would be helpful (Ref. D-1 and Ref. D-2).

For larger plastics, use of compostable plastics may become problematic if they are mixed with standard plastics. It may be difficult to readily see the difference during feedstock inspections, and would require additional training and labor resulting in increased operating costs. The respondents were not certain of

the economics of the compostable plastics (i.e., are they available and affordable to the suppliers) but suggested that working with the suppliers of bio-compostables to indicate what products are needed in the composting industry is essential (Ref. D-3).

5.1.2 Transportation Issues

The mode of transporting feedstock to the compost facilities represented in this follow-up study varied. Some of the transportation scenarios include:

- Facility operates its own fleet of specialized trucks for food waste pickup; yard wastes are hauled by an outside party (Ref. D-1).
- Suppliers drop off yard waste feedstock at the compost yard (Ref. D-2).
- Suppliers hire transporter to bring food wastes to the compost yard (Ref. D-2).
- The City provides collection of food waste, commingled with yard waste from its residential collection (Ref. D-3).

As expected, issues from these differing methods vary; however, with one exception the primary issue of concern is the transportation costs based on distance traveled and cost of fuel. Therefore, the location of the compost facility relative to the source of feedstock is a critical variable. The transportation costs are either born by the supplier or added to the price charged to the supplier in the price per yard tipping fee (Ref. D-1).

Although raised as an issue during the first round of interviews, only one respondent in the follow-up interviews had a concern with the availability of the haulers. He stated that transportation has not historically been an issue; but the recent discovery of an invasive species in the area called the “Jumping Worm” has resulted in the need to find new sources of leaves from a non-impacted area at a greater distance to his facility and also in the need to find new transporters (Ref. D-2). More discussion on this issue is provided in Section 5.2 – Other Concerns.

5.1.3 Standardized Regulations for Variable Size Operations

Interviewees in our initial study raised a concern that regulations do not address small and large facilities in a manner that accounts for the issues that exist for a facility based on the size of operation. Respondents in the follow-up study agreed. Respondents expressed concerns that small facilities cannot be expected to meet the same permitting standards as large facilities. Other respondents believe that without the same regulatory standards applied to all operations, the smaller operators are at a competitive advantage and are not monitored to the same degree (Ref. D-2). One respondent stated that the challenge is to create common sense regulations that are protective of the environment but not targeted towards one level of operations (Ref. D-3).

Depending on the changes to regulations, the consensus among respondents was that changes in regulations will likely increase the cost to comply, including the initial capital investment and overall operating costs, such that it may put smaller operations out of business (or impede entry to the industry). In general, the respondents reported that for operations that are privately owned, there

would be significant impacts on the bottom line, thereby increasing costs of the final end product through trickle down (Ref. D-2 and Ref. D-3).

The suppliers of feedstock may find the economics of composting no longer viable if they are required to pay more to the composting facilities to accept their materials. If regulatory changes result in increased operating costs for operators, the increased costs are passed along to suppliers and consumers. One interview participant is of the opinion that regulations need to be written so that that they do not provide a barrier to entry for smaller interested composting operators, because the economic costs involved with establishing an operation would be too great to bear (Ref. D-3). Additionally, another interviewee indicated that regulatory oversight should be the same for all parties. Individuals who do not receive as much oversight may operate out of compliance, which can damage the whole image of the composting industry (Ref. D-2).

Compost facility neighbors can be negatively impacted by poor facility management, such from odors or leachate/runoff concerns. Any changes to regulations that might not be as protective of the environment or air quality would not be acceptable to the general public.

In conclusion, there is a concern with compost facility operators that small operations may be regulated differently than large, with the impact or magnitude depending on the perspective of the stakeholder and the specific regulation. There is a general consensus that any change to regulation should be fully considered with regard to how it will impact each stakeholder in the composting industry. Regulations should be written in a common sense way that considers the implied costs that will be passed on to operators, suppliers and end-product users, while maximizing protection of the environment and the public's health.

5.2 Other Concerns

One respondent elaborated on a concern that had not been raised in earlier interviews – the impact of invasive species (Ref. D-2). Historic examples include certain aphids, beetles, and the Emerald Ash Borer, which have resulted in restrictions in the composting industry. More recently, the Jumping Worm (*Amynthas agrestis.)* has been reported in 14 Wisconsin counties — including Sheboygan, Jefferson, Waukesha, Milwaukee and Racine counties. The worm, also known as the Crazy Worm, is reported to damage the soil conditions, by disrupting the natural decomposition of leaf litter on the forest. Accordingly, the respondent's facility no longer accepts leaf waste from two nearby counties where the Jumping Worms are found. Additional information on this invasive species can be found at:

- http://dnr.wi.gov/topic/invasives/documents/JumpingWormFactSheet.pdf
- http://fox6now.com/2015/06/25/jumping-worms-invade-wisconsin-dnr-warns-the-risk-of-crazy-species-spreading/
- http://news.discovery.com/earth/plants/invasive-jumping-earthworm-found-in-the-midwest-140719.htm

Table 6: Summary of Attended Training

Leaf feedstock is essential to the composting process because it provides a dry, carbon-rich feedstock that is well balanced through mixing with wet, nitrogen-rich food scrap feedstock. Operating costs increase as the operator must travel farther to find a source of leaf feedstock to avoid the worm and to prevent spreading of this invasive species. The respondent expressed a need for greater information to raise awareness of the concern and to educate compost operators on the need for changes to process operations to prevent spread of the worms through their inadvertent presence in their product (Ref. D-2).

6.0 Summary and Recommendations

A summary of findings and recommendations for each of the research areas (Region 5 States' Regulatory Requirements, Training Course Availability, Operator Interviews and Follow-up Interviews) are presented below.

6.1 Region 5 State's Regulatory Requirements for Food Scrap Waste Training

Region 5 states do not currently require compost operator training specific to food scrap waste management. Minnesota and Ohio require general compost operator training. New Minnesota regulations require operators to take an initial 24-hour training course and five hours of continuing education work annually thereafter. While MPCA is developing a list of approved courses, they currently do not offer internal training for compost operators or a process for the approval of courses that meet the new requirements. MPCA does not yet have a written procedure or approval list available at this time, but according to the MPCA representative they plan to generate a list. Ohio requires that a certified operator manages the facility, with specific training needed to meet certification requirements but no certification course is currently offered.

Recommendations include:

- States currently without requirements for basic compost operator training may wish to add them. Addressing food scrap waste management in the training requirements and expansion of training to all operating personnel warrants consideration.
- A communication tool is needed to ensure compost operators know what courses are approved and meet state requirements. States should consider posting on their website a list of available courses that meet their requirements.
- States could develop a basic on-line or workshop compost operating training course that meets any current requirements, and addresses food waste management and issues of concern to compost operations in the state.
- A recordkeeping system to track and document educational requirements are met by compost operators should be required; this could be most easily addressed by adding training and record keeping requirements to the permitting or licensing program.

Table 6: Summary of Attended Training

6.2 Availability of Compost Operator and Food Scrap Waste Training

Toeroek identified several compost operating training courses that are available to Region 5 compost operators. The most well-known and comprehensive courses are those offered by the US Composting Council (5-day) and Midwest Composting School (3-day). No Region 5 state provides a list of approved or available classes in their state. The US Composting Council composting course offers national-level training courses which are five days and provide hands-on field experience. It is offered in multiple, locations each year usually on the east or west coast. Midwest Composting School is presented annually in the one of the Midwest states. Solid Waste Association of North America (SWANA) holds trainings quarterly along the east coast, most frequently Silver Springs, Maryland and Orlando, Florida. BioCycle holds two conferences annually, one at a location on the west coast, and one at location on the east coast. These conferences usually include a preconference workshop that is similar to training, and exhibits and presentations sessions that describes research or upcoming technology that is new to the industry. The State of Michigan routinely offers a one-day workshop that is targeted towards beginners. More local courses and workshops are available from colleges, universities, state compost councils and trade associations; e.g., Ohio State University Extension offers a comprehensive, two-day course.

Recommendations include:

- More local, affordable courses are needed to address state and regional specific operations and regulations.
- Information on the currently available courses indicates most of the important operational issues are covered, although food scrap wastes do not appear to be addressed as a separate topic based on the available courses evaluated. Several state agency contacts indicated that food scrap waste management concerns can be addressed under more general topics in available training courses.
- States can raise awareness about available training courses by maintaining a list on the Agency's website and partner with local trade associations, universities and extension groups to implement workshops targeted to specific audiences or topics including food waste.
- Local compost councils and organizations can take a lead in communicating about available courses, through newsletter, social media and email communications.

6.3 Operator Interview Findings

Through discussion with six Region 5 compost operators, we found that most of the important subject matter desired by compost operators is included in the currently available training. Most facilities are open to sending all of their operating staff to training on at least a scheduled basis if not annually. One interviewee indicated that high turnover rates at his facility made off-site training not cost-effective. Operators indicated classroom training with hands-on experience was the most preferred training method, with webinars viewed as not being suitable for as wide of an audience. Many interviewees remarked on the high importance of networking as an education method for operators.

Table 6: Summary of Attended Training

Specific recommendations to meet training needs include:

- Target training to a specific type of facility; provide break-out sessions, if necessary, to provide more focus to small operator needs and address state-specific issues or regional-specific concerns (e.g., cold weather composting issues).
- Design courses to maximize opportunities for networking and learning from other operators.
- Look to provide workshops on timely issues, such as mortality composting and invasive species.
- Seek trainers with the liberty to fully discuss operations without restriction of protecting trade secrets.

6.4 Follow-Up Interviews

Toeroek explored four additional topics, unrelated to composter training based on information provided by some interviewees. These included variability in feedstock quality, non-compostable contaminants in feedstocks, issues with transportation of materials from the supplier to the facility, and the concern over non-standardized regulations. Additionally one respondent identified concerns over invasive species, such as the Jumping Worm, which has the potential to negatively impact the composting industry. The four topics are summarized below:

- The respondents agreed that variation in feedstock is the nature of composting. The variation is best managed through education of the supplier and by adjusting the process operations to address the variation. Because this general topic is addressed in most compost operator training courses, no further action is recommended.
- Plastic is the most prevalent non-compostable contaminant in food scrap wastes. With properly educated suppliers, more consistent, high quality feedstock can be obtained. The respondents felt that compostable plastics (such as food containers) would be desirable but may not be cost effective if the cost of the plastic is too high and additional labor is necessary to inspect incoming feedstock containing mixed plastics.
- Plastic produce identification stickers, applied to fruits and vegetables in grocery stores, pose a significant problem because they do not degrade and they are too small to remove manually or mechanically. Further education of the food industry and individual suppliers is needed to foster the development of biodegradable stickers or removal of the stickers from the food scrap wastes.
- While the need for leveling the playing field is a long standing concern among large and small operators, an open dialogue is needed to evaluate regulatory needs and operator concerns. A common-sense regulatory approach that creates a fair playing field for all operators would benefit current operators and individuals interested in entering into the industry.
- Invasive species can quickly and severely impact process operations and the availability of feedstock with the potential ramifications to operating costs. There is a need for greater information to raise awareness of the concern and to educate compost operators on the need for changes to process operations to prevent spread of the invasive species through their

inadvertent presence in their product. States may wish to provide information on websites or through social media, send out alerts by way of state compost councils, colleges and universities, or host seminars to address process concerns.

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Facility 1: Belleville, Illinois

OPERATIONS

Size of Facility: *The facility comprises 45 acres of windrows (permitted) for active composting and 4-5 acres of supportive land (buildings, retail area, etc.).*

Years of Operations: *The site has been active since 1996, when BFI began accepting yardwastes.*

No. of Employees: *5 compost operators, 3 mechanics, 1 office manger*

What are your responsibilities? As site manager responsibilities include o*versee the site, record-keeping for state and local regulatory agencies, helping employees, and testing feedstocks and compost.*

Volume of Feedstock Accepted: *400,000 cubic yards annually*

Volume of Final Product Sold: *35,000-40,000 cubic yards*

Feedstock/ Types of Materials Currently Accepted: *MCF accepts grass, leaves, manure, food waste*

When did you start accepting food scraps? *4-5 years ago*

Have there been any other changes in the types of feedstock you accept?

Food scraps make up what percentage of your accepted feedstocks? *The permit allows up to 20% of total volume for food scrap wastes*

What sources do your food scraps come from? *MCF accepts food scrap wastes from grocery stores (e.g., Wal-Mart), restaurants, college cafeterias*

What, if any, are your primary operating concerns or issues? What challenges do you face? *Mr. Willmann reports their challenges include wildlife scavenging (birds especially in winter) and contaminants (plastics and glass). Odor issues go along with composting. They turn when it is sunny and have good wind direction.*

Who is responsible for regulatory compliance at your facility? (Position, not individual's name) *Site Manager*

Has your facility been inspected by state or local authorities? If so, was it a standard compliance inspection by the state or other and when? *St. Clair County inspects the facility monthly. The State of Illinois inspects the facility annually.*

Do you have an internal inspection checklist? If so, would you allow us to see a copy of it? *There is no internal checklist, although Site Manager personally checks items based on the State of Illinois compost permit requirements. The items that are routinely checked include oxygen content, moisture, and temperature.*

Are there any reoccurring issues at your facility? If so, what strategies do you use to address it? *Reoccurring issues at the site include containing water to the site and removing contaminants (plastic and glass). Illinois requires working on a pad. Water run-off cannot leave the site so it has to be recycled; they use 24/7 irrigation.*

They had to purchase specialized equipment to address plastics and remove them to a landfill. Glass is the worst and cannot be taken out easily.

They take the yard waste an build half of a windrow, make a trench and then deposit food scrap followed by remaining windrow for cover. This process minimizes birds.

TRAINING REQUIREMENTS

To your knowledge, does your state require operator training? If so, what are the requirements? *He is not aware of any state requirements.*

Does your company require training? *There are no company requirements for training.*

If so, what personnel are trained? Is this off-site or on-site? In a classroom? On-the-job training? *Site managers have been trained through the U.S. Composting Council Training in 2010*

If the site manager is the only individual trained, how is this knowledge transferred to employees? They use w*eekly "Toolbox" meetings with all employees to discuss safety, new techniques, and operational issues that may arise. They also provide on the job training.*

Would your company consider training lower level employees? If so, what would be needed to accomplish this? Better availability? Shorter courses? *Possible, decision to train is made based on available funding in budget.*

ADDITIONAL QUESTIONS

What training topics do you believe are the most relevant to the composting of food scraps? *They found sampling methodology and discussion of experiences and lessons learned from other attendees to be helpful. They thought he learned as much from fellow attendees as the course*

What topics would you most like to see in a training course? *Keep training fairly broad in order to cover everything that needs to be addressed (from start-up to finish products).*

How did you apply what you learned at the trainings to operations at your facility? Can you provide examples? *Improved testing procedures and methods for dealing with pests.*

What sort of format is most effective? Webinar? Classroom? Hands on? Lecture? *The interviewee recommends open classroom training where participation is encouraged. They found it extremely beneficial to have individuals from a wide variety of backgrounds attend, so that experiences and lessons learned can be discussed.*
What would be the best way for you to obtain information on available training? *Through magazine advertisement or through email*

TRAINING COMPLETED

Please complete the table below with information regarding training courses, or continuing education classes you've completed (other than on-the-job training).

Course Name	Training Provider	Year of Training	Training Costs	Travel Costs	1.) What was the most valuable training component? 2.) What was it missing?	What topics were covered? (Please check all that apply)									
						Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
40 Hr. General Composting	U.S. Composting Council	2010	$unkown	$1,000	1.)Testing aspects (rows and product' recipes; bulk density 2.) Recipes were for small yards; made piles for hands-on but not on a big scale.	X	X	X	X	X	X	X	X	X	?
			$	$	1.) 2.)										
			$	$	1.) 2.)										

Have others at your facility completed these course(s)?
How did you learn about the training course(s) you have attended?
Did any of these trainings count towards Continuing Education Units (CEUs)?

Facility 2: Wausau, Wisconsin

OPERATIONS

Size of Facility: *3 composting yards; 15 acres total*
Years of Operations: *20-21 years of composting operations*
No. of Employees: *12-13 employees, not all involved in composting side of business*
What are your responsibilities? *Purchasing, Shipping, Receiving, Pricing*
Volume of Feedstock Accepted: *leaf materials from pine needles is approximately 95% of what is accepted, also grass clippings and brush material, which is ground and used in vegetable waste composting.*
Volume of Final Product Sold: *3500 cubic yards of leaf compost; 600-700 cubic yards of vegetable compost*
Feedstock/ Types of Materials Currently Accepted: *Grass clippings, brush, vegetable waste*

When did you start accepting food scraps? *3 years ago*

Have there been any other changes in the types of feedstock you accept? *Occasionally a load of grain from brewery*

Food scraps make up what percentage of your accepted feedstocks? *Percentage not given, 700-800 cubic yards*

What sources do your food scraps come from? *Walmart and Sam's Club provide vegetable waste*

What, if any, are your primary operating concerns or issues? What challenges do you face? *Food scraps are hard to incorporate in the winter because of the moisture associated with that waste is often frozen. Odor can be an issue if not managed correctly.*
Who is responsible for regulatory compliance at your facility? (Position, not individual's name)
Yard Production Manger – gets temperatures of compost piles and takes samples which are sent in twice a year.
Has your facility been inspected by state or local authorities? If so, was it a standard compliance inspection by the state or other and when? *DNR inspects usually every 3-4 months; USDA monitors yearly for paperwork renewal and primarily looks at invasive species.*
Do you have an internal inspection checklist? If so, would you allow us to see a copy of it? *No.*
Are there any reoccurring issues at your facility? If so, what strategies do you use to address it? *Drought conditions in fall can cause leaves to be very dry. Difficult to maintain needed moisture content in varying weather conditions*

TRAINING REQUIREMENTS

To your knowledge, does your state require operator training? If so, what are the requirements? *No.*
Does your company require training? *No.*

If so, what personnel are trained? Is this off-site or on-site? In a classroom? On-the-job training? *Hands on, tour facilities, work on temp management. On the job training.*

If the site manager is the only individual trained, how is this knowledge transferred to employees?

Would your company consider training lower level employees? If so, what would be needed to accomplish this? Better availability? Shorter courses? *Yes, would send individuals to training if the course looked useful for specific operations.*

ADDITIONAL QUESTIONS

What training topics do you believe are the most relevant to the composting of food scraps?
What topics would you most like to see in a training course? *Would like an overview of styles of equipment used for making compost.*
How did you apply what you learned at the trainings to operations at your facility? Can you provide examples?
What sort of format is most effective? Webinar? Classroom? Hands on? Lecture? *Hands on would be the best option*
What would be the best way for you to obtain information on available training?

ADDITIONAL QUESTIONS

The interviewee attended an annual Green Industry Networking meeting, but has not attended the last few years. The meeting included all the composters in the areas and facilities were toured. Individuals were not willing to share industry secrets.

TRAINING COMPLETED

Please complete the table below with information regarding training courses, or continuing education classes you've completed (other than on-the-job training). *Has not attended specific trainings; all hands-on learning through years of experience*

Course Name	Training Provider	Year of Training	Training Costs	Travel Costs	1.) What was the most valuable training component? 2.) What was it missing?	What topics were covered? (Please check all that apply)									
						Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
Would like to see the following topics covered			$	$	1.) 2.)	x	x	x	x	x	x	x	x	x	X
			$	$	1.) 2.)										
			$	$	1.) 2.)										

Have others at your facility completed these course(s)?
How did you learn about the training course(s) you have attended?
Did any of these trainings count towards Continuing Education Units (CEUs)?

Facility 3: Ann Arbor, Michigan

OPERATIONS

Size of Facility: *Runs a former municipal site for the City of Ann Arbor. It is 28 acres in size.*

Years of Operations: *The site has operated since about 1990 for yard waste composting. The company took over under contract to the City of Ann Arbor in February 2011.*

No. of Employees: *Varies by season; 3 in summer; 2 in winter.*

What are your responsibilities? *Interviewee is in charge of operations. He is not on site day to day; but if there is a need for help, he pitches in for operations, runs equipment right next to operators.*

Volume of Feedstock Accepted: *Company accepts 14,000 tons of yard waste& wood waste annually, approximately 10 % is food scrap. The food scrap waste is picked up in the residential pick-up of yard waste. Therefore, the food scrap feed stock is already commingled with yard waste, and it is difficult to estimate volume. The 14,000 tons is approximately equal to 63,000 cubic yards based on conversion factor of 4.5 cubic yards per ton provided by him (Note – this conversion factor looks a little high based on published conversion factors).*

Volume of Final Product Sold: *20-22,000 cubic yards of finished compost and mulch.*

Feedstock/ Types of Materials Currently Accepted:

When did you start accepting food scraps? *Company started residential collection approximately 18 months ago. Prior to that, they only accepted post-consumer food wastes from a couple of accounts – Univ. of Michigan – from dorm kitchens, which is a small percentage of materials.*

Have there been any other changes in the types of feedstock you accept? *The City of Ann Arbor used to only take yard waste. Now, the company takes anything organic from homes – e.g., meat, fish, and bones. They do get some paper, but they do not encourage it.*

Food scraps make up what percentage of your accepted feedstocks? *They must estimate by change in total volume (i.e., difference in total volume now versus total volume when only accepting yard waste) since it is commingled with yard waste. The difference in old volume versus new volume is what they base their estimate of percentage on.*

What sources do your food scraps come from? *Wastes are collected at residential curb-side. Residential food stock mixed with yard waste at the curb. Therefore, hard to determine the % of wastes is hard.*

What, if any, are your primary operating concerns or issues? What challenges do you face? *The number one issue is contaminants as it relates to products. They need to educate their community on what can go in the recycle carts. This issue is not as sensitive with post-consumer food waste – (3rd party). The pilot study they are in for residential waste so far indicates that that they do not have too much (unacceptable) amount of contaminants. Glass is a concern, they are always on the lookout for it. Plastics is the second largest concern. Biological contaminants are not as big of concern to them as they maintain high temp and extended period of time. Typically spend over one year in windrows.*

Who is responsible for regulatory compliance at your facility? (Position, not individual's name) *The WCO Sr. Vice President signs compliance documents. Documentation of compliance is done by the project manager. City cosigns as they are still owner of site.*

Has your facility been inspected by state or local authorities? If so, was it a standard compliance inspection by the state or other and when?
Michigan DEQ conducts yearly inspections. He is not aware of any local inspections.

Do you have an internal inspection checklist? If so, would you allow us to see a copy of it?
Yes, he will send it. The inspection checklist is used for monitoring requirement and to document turns of windrows. They use USCC QA Testing Program and post results on line (http://www.wecareorganics.com/products_testing.htm).

Are there any reoccurring issues at your facility? If so, what strategies do you use to address it?
They have modified operations several times. When the City operated yard waste, they used tub grinder with 10 employees. They use a different type of grinder – slow speed shredder. It doesn't grind up plastics like the shredder. Therefore, an added benefit is that plastics stay large and pass through process. It is then easier to screen out at the back end of the process.

They are isolated so there are no odor or nuisance complaints. This is due to commingling of food waste and yard waste is already done for them. They run a high C:N(1:10) ratio so no odor problems. They typically run a 1:10 ratio of Food Waste to Yard Waste, you want more carbon than organic to keep down odors.

TRAINING REQUIREMENTS

To your knowledge, does your state require operator training? If so, what are the requirements? *Not required.*

Does your company require training?
Yes

If so, what personnel are trained? Is this off-site or on-site? In a classroom? On-the-job training?
All operators go to Michigan Operator Workshop every other year. He actually participated as a speaker in two this year. Company also has an annual operator training workshop (We Care Operates in the northeast US, mid-Atlantic , PA and MI). It is a corporate meeting = 50% operations -50% marketing.

One full time operator, one operation manger, and Mike N. receive training.

If the site manager is the only individual trained, how is this knowledge transferred to employees?
WCO also performs on the job training,

Would your company consider training lower level employees? If so, what would be needed to accomplish this? Better availability? Shorter courses?
Already do.

ADDITIONAL QUESTIONS

What training topics do you believe are the most relevant to the composting of food scraps? *Best source is book Compost Operations Guide: BMP for Commercial Site Compost Operations; 2011 Update. Michigan State Univ Extension, Recycling Coalition Deals with Compost – the science of it, including biology and core principles and critical factors. Sets the stage how and why it works and more importantly why not. Everything else feeds off of it.*

What topics would you most like to see in a training course?
Same as in book.

How did you apply what you learned at the trainings to operations at your facility? Can you provide examples?
Best information is the concept of recipes for good composting and the seasonality of it. For example, in their case, Ann Arbor does not pick up yard waste/food scrap waste in winter months. If they move to the next step and bring in post-consumer food waste [PCFW] - like from a commercial account from canning plant or grocery store, this would likely come in year around, and is higher in strength since not blended at curb side. Customers would expect a year around service, but carbon yard waste not available. Therefore, need to change SOPs, need to either find another source of high carbon or else maintain a carbon inventory so can operate through the winter months.

What sort of format is most effective? Webinar? Classroom? Hands on? Lecture?
Text. Class room

A lot of times, attendees do more training than teachers. Audience gives ideas and trainers act a facilitator.

He is not sure that webinar would work form his employees. Not sure if they have skills and accessibility of computer and they are more in need of hands-on.

What would be the best way for you to obtain information on available training?

Misc.

Separate out training for commercial versus small time operators. State of Michigan is looking to set-up more regulations to bring up to higher standard.

The advantage of the training for operators is that it provides a link to what they see in their operations and now know why it is happening. An operator can tell by looking at the windrow (the color, temperature, etc.), where it is in the process. With training, they can then know why that is and better understand the whole process.

TRAINING COMPLETED

Please complete the table below with information regarding training courses, or continuing education classes you've completed (other than on-the-job training).

Course Name	Training Provider	Year of Training	Training Costs	Travel Costs	1.) What was the most valuable training component? 2.) What was it missing?	What topics were covered? (Please check all that apply)									
						Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
Michigan	Michigan Resource Council, DEQ, MSU Ext. Resource Recycling Systems (Consultant)	2015	$	$	1.)Health and Safety – received good feedback 2.) Hands on experience Equipment and Mechanics (this is what is for the operators – running equipment is big issue).	x	x	x	x	?	x	?	x	x	x
			$	$	1.) 2.)										
			$	$	1.) 2.)										

Have others at your facility completed these course(s)?*Yes*
How did you learn about the training course(s) you have attended? *Coalition*
Did any of these trainings count towards Continuing Education Units (CEUs)? *Yes*
Other notes. S*eparate out commercial versus small time operators. State of Michigan is looking to set-up more regulations to bring up to higher standard.*

Facility 4: South Lyon, Michigan

OPERATIONS

Size of Facility: *195 acres farm; 16 acres for composting*
Years of Operations: *1994*
No. of Employees: *4 full-time and 2 seasonal employees*
What are your responsibilities? *Owner – oversees entire operation*
Volume of Feedstock Accepted: *30,000 cubic yards*
Volume of Final Product Sold: *20,000 cubic yards*
Feedstock/ Types of Materials Currently Accepted:

When did you start accepting food scraps? *7 years ago*
Have there been any other changes in the types of feedstock you accept? *Food scraps was the main change.*
Food scraps make up what percentage of your accepted feedstocks? *1/8*
What sources do your food scraps come from? *Their food scrap wastes come from companies that have a cafeteria style environment such as Bosch, Google, University of Michigan. They do not currently accept from private residences*

What, if any, are your primary operating concerns or issues? What challenges do you face? *Odors are the number one concern. Facility 4 is located in a densely populated area surrounded by a non-agriculture population.*
Who is responsible for regulatory compliance at your facility? (Position, not individual's name) *The owner*
Has your facility been inspected by state or local authorities? If so, was it a standard compliance inspection by the state or other and when? *Yes, through the 20 years of operation, it has only been inspected once in 1998, due to an odor complaint. MDEQ performed the inspection and provided a recommendation to remediate the situation. Inspections occur when complaints are made.*
Do you have an internal inspection checklist? If so, would you allow us to see a copy of it? *No written inspection checklist. They have been in the business so long that daily operations are routine and no checklist is needed. They maintain logs that indicate when windrows were turned and record the compost temperature.*
Are there any reoccurring issues at your facility? If so, what strategies do you use to address it? *Avoiding odors is the main concern, and it is addressed by working on timely handling of the feedstocks.*

TRAINING REQUIREMENTS

To your knowledge, does your state require operator training? If so, what are the requirements? *Training is not required by state. They do attend training when it's offered.*
Does your company require training? *The company sends its employees to the state training when it is offered off-site.*

If so, what personnel are trained? Is this off-site or on-site? In a classroom? On-the-job training? *All employees are sent to the training. The training is generally held off-site, although the facility did host it one year. Attendees were able to view the company's operations.*
If the site manager is the only individual trained, how is this knowledge transferred to employees? *N/A*

Would your company consider training lower level employees? If so, what would be needed to accomplish this? Better availability? Shorter courses? *The lowest level employee at the training was sent to the Compost Operator training this year. All employees are sent to the training.*

ADDITIONAL QUESTIONS

What training topics do you believe are the most relevant to the composting of food scraps? *Clear cut guidance of what are sources of Carbon and what are Nitrogen. This is tricky when it comes to accepting food scraps in a mixture. Moisture level is also difficult to control when food scraps are received. Interviewee said that they tell their customers that the food scrap consistency should be about the same consistency as cooked oatmeal; however sometimes customers will send food that has already liquefied.*
What topics would you most like to see in a training course?
Methods without cement pad to prevent leaching liquids and prevent blowing napkins (trash).
How did you apply what you learned at the trainings to operations at your facility? Can you provide examples?
Interviewee hasn't learned anything new lately. The course is usually geared towards municipal composting facilities, not composting on a farm, like this facility's operation.
What sort of format is most effective? Webinar? Classroom? Hands on? Lecture? *Interviewee does well with webinars, but feels most individuals would do well with a combination of classroom/hands-on training. Site visits work the best. The ability to network is also important.*
What would be the best way for you to obtain information on available training? *Through emailing or a website.*

TRAINING COMPLETED

Please complete the table below with information regarding training courses, or continuing education classes you've completed (other than on-the-job training).

Course Name	Training Provider	Year of Training	Training Costs	Travel Costs	1.) What was the most valuable training component? 2.) What was it missing?	What topics were covered? (Please check all that apply)									
						Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
Compost Operator Training	Michigan Department of Environmental Quality and Michigan Recycling Council	1 day training, usually annually	$120	$40 (gas $)	1.) Networking is the most valuable component 2.) More free time to network and more practical information about accepting food waste.	x	x	x		x	x	x	x	x	x

Have others at your facility completed these course(s)? *yes; all*
How did you learn about the training course(s) you have attended? *Through the Michigan Recycling Council (Interviewee was the Secretary of the organization at its start).*
Did any of these trainings count towards Continuing Education Units (CEUs)?

ADDITIONAL NOTES

- *The lack of available options for hauling compostable food scraps from a customer to the composting facility makes it difficult to accept larger quantities of food scrap.*
- *Depackaging is needed before the facility can accept food scraps from grocers (interviewee used the example of salad containers from Costco). If compostable packaging becomes widely produced, food scrap composting will greatly increase.*
- *Interviewee mentioned they learned much of their operational practices from the book "On-Farm Composting Handbook"*

Facility 5: Grand Rapids, Michigan

OPERATIONS

Size of Facility: *The Company operates 3 facilities that accept 20,000 cubic yards, 40,000 cubic yards and 60,000 cubic yards, respectively. The 40,000 cubic yard facility is the only one to accept food scraps.*
Years of Operations: 15
No. of Employees: *Three employees*
What are your responsibilities? *In addition to ownership responsibilities, the interviewee fills in for employees when they are out.*
Volume of Feedstock Accepted: *350 tons of food scraps a week*
Volume of Final Product Sold: *15,000-18,000 cubic yards a year*
Feedstock/ Types of Materials Currently Accepted:

When did you start accepting food scraps? In *2009, the company started with a collection program with a contractor to haul waste to the facility. The customers now contract with their own haulers to bring the food waste to the facility.*

Have there been any other changes in the types of feedstock you accept? *Yard Waste, Manure and Food Scraps are accepted and ground up prior to incorporate at the facility. This helps prevent leaching due to excessive moisture.*

Food scraps make up what percentage of your accepted feedstocks? *350 out of 1500-1700 tons per month (20-23%)*

What sources do your food scraps come from? Food scraps come from *restaurants, cafeterias, and food processing facilities.*

What, if any, are your primary operating concerns or issues? What challenges do you face? P*rimary operating concerns are standing water, leaching, and animal scavengers.*
Who is responsible for regulatory compliance at your facility? (Position, not individual's name) *Interviewee is.*
Has your facility been inspected by state or local authorities? If so, was it a standard compliance inspection by the state or other and when? *Facility is inspected sporadically; more so than other facilities as it is situated next to a landfill. There have been citations issued for standing water in the past.*
Do you have an internal inspection checklist? If so, would you allow us to see a copy of it? *No internal inspection checklist. Problems are addressed as they occur.*
Are there any reoccurring issues at your facility? If so, what strategies do you use to address it? *Standing water is addressed by grading ditches between the windrow to drain water away. Scavengers are kept away by quickly incorporating food scraps with yard waste and other feedstocks.*

TRAINING REQUIREMENTS

To your knowledge, does your state require operator training? If so, what are the requirements? *No.*
Does your company require training? *No.*

If so, what personnel are trained? Is this off-site or on-site? In a classroom? On-the-job training? *Interviewee has been trained along with one other key individual. This training occurs off-site at MI DEQ training.*

If the site manager is the only individual trained, how is this knowledge transferred to employees? *Other employees are trained on the job.*

Would your company consider training lower level employees? If so, what would be needed to accomplish this? Better availability? Shorter courses? *Additional training is not considered because of the high turnover. On the job training is the best option for this company.*

ADDITIONAL QUESTIONS

What training topics do you believe are the most relevant to the composting of food scraps?
What topics would you most like to see in a training course?
How did you apply what you learned at the trainings to operations at your facility? Can you provide examples?
What sort of format is most effective? Webinar? Classroom? Hands on? Lecture?
What would be the best way for you to obtain information on available training?

TRAINING COMPLETED

Course Name	Training Provider	Year of Training	Training Costs	Travel Costs	1.) What was the most valuable training component? 2.) What was it missing?	What topics were covered? (Please check all that apply)									
						Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
Compost Operator Training	MDEQ	2015	$	$	1.) Networking 2.) Would like more practical in-depth training from people who are in the composting industry, but are not direct competitors so they would be more willing to share industry secrets. Also, felt that training should be held for industry professionals, not MDEQ, college students, etc.	X	B	X	B		FP		X	T	
Compost Operator Training	U.S. Composting Council	3 years ago?	$	$	1.) Same as above 2.) Same as above – also mentioned composting biosolids with woodchips – not practical for MI and no alternatives were suggested.	X		X	B	X	FP		X		

Key to table: X = covered; B= Covered briefly, FP= Covered for Final Product; T = Temperatures only

Have others at your facility completed these course(s)?
How did you learn about the training course(s) you have attended?
Did any of these trainings count towards Continuing Education Units (CEUs)?

ADDITIONAL NOTES

The interviewee noted there is a flaw within the way composting is regulated in the state of Michigan that causes an unleveled playing field. There are fewer regulations for small composters, often family farms, which allow them to accept feedstocks for a cheaper rate. The interviewee believes state regulations need to be standardized for all compost operators.

Facility 6: Duluth, Minnesota

OPERATIONS

Size of Facility: *7900 tons per year permitted*
Years of Operations: *14 years*
No. of Employees: 4
What are your responsibilities? *Direct supervision*
Volume of Feedstock Accepted: *Average 2800 tons annually*
Volume of Final Product Sold: *3000 yards*
Feedstock/ Types of Materials Currently Accepted:

When did you start accepting food scraps? *2001*
Have there been any other changes in the types of feedstock you accept*? No*
Food scraps make up what percentage of your accepted feedstocks? *40%*
What sources do your food scraps come from? *Facility sources are restaurants, stores and industrial.*

What, if any, are your primary operating concerns or issues? Primary concerns are *odors, winds, litter and limited space*.

What challenges do you face? *The challenges are producing enough product to meet demand and the operating concerns listed above.*

Who is responsible for regulatory compliance at your facility? (Position, not individual's name*) Solid Waste Services Director*

Has your facility been inspected by state or local authorities? If so, was it a standard compliance inspection by the state or other and when?

Minnesota Pollution Control Agency inspects the facility annually.

Do you have an internal inspection checklist? If so, would you allow us to see a copy of it?
Yes and Yes

Are there any reoccurring issues at your facility? If so, what strategies do you use to address it? *The company addresses issues through modifying standard operating procedures (SOPs), providing new equipment, conducting networking research and working with councils, and by experiencing AH- HAH moments.*

TRAINING REQUIREMENTS

To your knowledge, does your state require operator training? *Yes and it is within the regulations. 7035.2836*

If so, what are the requirements?

The personnel training program plan must address the requirements of part 7035.2545, subparts 3 and 4, and the specific training needed to operate a compost facility in compliance with this subpart and subparts 6 and 7.

Does your company require training? Yes.
If so, what personnel are trained? Is this off-site or on-site? In a classroom? On-the-job training (OJT)?

OJT on-site and class room. One off site with hands on and classroom. Online topic specific. They participate in Midwest Compost School and United States Compost Council (USCC) and Minnesota Compost Council trainings

If the site manager is the only individual trained, how is this knowledge transferred to employees*? N/A*
The company currently budgets one person per year for training.
Would your company consider training lower level employees? If so, what would be needed to accomplish this? Better availability? Shorter courses? *The company currently trains as many people as possible; more local training is best (In state and on site-hands on). The company finds it is best if operator goes to other sites as they learn more.*

ADDITIONAL QUESTIONS

What training topics do you believe are the most relevant to the composting of food scraps?

It is critical to review composting in its entirety and characteristics of food waste in the decomposition process. Collection and clean product are major issues. To establish local compost locations is paramount. With-out a processing facility within reasonable distance, the transportation costs of the food waste, added after the expense of collecting and educating, is cost prohibitive. Training specific to individual state regulations is also important.

What topics would you most like to see in a training course?

The company would like to see practical compost processing for low-tech, small facilities. They would also like to see permitting and funding addressed – it is more work to get feedstock there than to compost and set-up.

How did you apply what you learned at the trainings to operations at your facility? Can you provide examples?

Provide printed information from the training, such as pictures and video, to employees at facility.

What sort of format is most effective? Webinar? Classroom? Hands on? Lecture?

Classroom and hands on

What would be the best way for you to obtain information on available training?

Email. Communicating through current state networks such as the Minnesota Compost Council.

Can we list her as a participant? yes

ADDITIONAL NOTES

Other challenges faced include:

- *finding haulers of waste to get food scraps to facility, separating glass/plastic*

TRAINING COMPLETED

Please complete the table below with information regarding training courses, or continuing education classes you've completed (other than on-the-job training).

Course Name	Training Provider	Year of Training	Training Costs	Travel Costs	1.) What was the most valuable training component? 2.) What was it missing?	What topics were covered? (Please check all that apply)									
						Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
Midwest Composting School			$	$	1.) Hands on networking 20 years Topics vary every year, can't remember specific topic coverage 2.)										
Online Courses for collection and odor	ONE DAY STATE ON LINE		$	$	1.) Collection – Odors, one hour in length; yes valuable 2.)										
MN Composting Council	ON SITE	1 day	$	$	1.) 2.)										

Have others at your facility completed these course(s)? Multiple years and sessions. *Please refer to the sites and entities I listed above for questions in table.*
How did you learn about the training course(s) you have attended*? Same as above*
Did any of these trainings count towards Continuing Education Units (CEUs)? *Yes -ALL*

Food Scrap Compost Operator Training: Interview Guide

Project Overview and Interview Directions

The U.S. Environmental Protection Agency (EPA) has undertaken substantial efforts to increase food waste reduction and diversion, with commercial composting of food scraps as an important waste diversion approach. States are amending their permitting regulations to allow food scraps to be composted along with yard wastes. Compost operator training to meet the new food scrap composting approach is a key tool for successful food waste diversion.

Toeroek Associates, Inc. (Toeroek) has been tasked by EPA to research available and accessible compost operator training programs for operators, focusing on programs that address requirements for food scrap compost operators. This guide will help prepare you for the interview scheduled on [date] and provides the questions that will be discussed during your interview. Your responses during the interview will provide valuable insight to determine the limitations of current training programs, as well as assisting in the future development of relevant training programs for food scrap composter operators.

BACKGROUND

Interviewee Name:
Job Title/Description:
Length of employment at current employment:
Length of employment in the industry:
Facility Name:
Email address:
Telephone Number:

OPERATIONS

Size of Facility:
Years of Operations:
No. of Employees:
What are your responsibilities?
Volume of Feedstock Accepted:
Volume of Final Product Sold:
Feedstock/ Types of Materials Currently Accepted:

- When did you start accepting food scraps?
- Have there been any other changes in the types of feedstock you accept?
- Food scraps make up what percentage of your accepted feedstocks?
- What sources do your food scraps come from?

What, if any, are your primary operating concerns or issues? What challenges do you face?
Who is responsible for regulatory compliance at your facility? (Position, not individual's name)
Has your facility been inspected by state or local authorities? If so, was it a standard compliance inspection by the state or other and when?
Do you have an internal inspection checklist? If so, would you allow us to see a copy of it?
Are there any reoccurring issues at your facility? If so, what strategies do you use to address it?

TRAINING REQUIREMENTS

To your knowledge, does your state require operator training? If so, what are the requirements?
Does your company require training?

- If so, what personnel are trained? Is this off-site or on-site? In a classroom? On-the-job training?
- If the site manager is the only individual trained, how is this knowledge transferred to employees?

Would your company consider training lower level employees? If so, what would be needed to accomplish this? Better availability? Shorter courses?

ADDITIONAL QUESTIONS

What training topics do you believe are the most relevant to the composting of food scraps?
What topics would you most like to see in a training course?
How did you apply what you learned at the trainings to operations at your facility? Can you provide examples?
What sort of format is most effective? Webinar? Classroom? Hands on? Lecture?
What would be the best way for you to obtain information on available training?

TRAINING COMPLETED

Please complete the table below with information regarding training courses, or continuing education classes you've completed (other than on-the-job training).

Course Name	Training Provider	Year of Training	Training Costs	Travel Costs	1.) What was the most valuable training component? 2.) What was it missing?	What topics were covered? (Please check all that apply)									
						Odors	Stormwater Management	BMPs	Target Moisture	Porosity	Sampling	Fire Suppression	Achieving Ideal C:N	Pathogen Contamination	Cold Weather Composting
			$	$	1.) 2.)										
			$	$	1.) 2.)										
			$	$	1.) 2.)										

Have others at your facility completed these course(s)?
How did you learn about the training course(s) you have attended?
Did any of these trainings count towards Continuing Education Units (CEUs)?

Tab B: MPCA Compliance/Inspection Calendar

MONTH	DUE DATE	DUE TO WHOM	REPORT/ACTION	SAMPLE REQUIRED
JANUARY	MONTHLY			
		Dept. of Revenue	% of residuals	
		MPCA	annual report	
		internal	site inspection	
FEBRUARY	MONTHLY			
		MPCA	SSOM annual report	
		internal	site inspection	
MARCH	MONTHLY			
		MPCA	annual report for YW	Finished product - inerts
		MPCA	Stormwater report	
		internal	site inspection	
APRIL	MONTHLY			
		internal	stormwater site inspection	
		internal	site inspection	
MAY	MONTHLY			
		internal	site inspection	
JUNE	MONTHLY			
		internal	site inspection	
JULY	MONTHLY			
		internal	site inspection	
AUGUST	MONTHLY			
		internal	stormwater site inspection	
		internal	site inspection	
SEPTEMBER	MONTHLY			
		internal	site inspection	
OCTOBER	MONTHLY			
		internal	site inspection	
NOVEMBER	MONTHLY			
		internal	site inspection	
DECEMBER	MONTHLY			
		internal	stormwater site inspection	
		internal	site inspection	

Tab D: Daily Inspection Sheet for Organics Site

Organics Site: Daily Inspection Log

Date / Day of Week: ______________________ Operator: ______________________

Wind Direction: ____________ Temp: __________ Water Shed Temp: ____________

Weather Details: ____

Equipment Inspection Completed: Loader: Yes / No Tractor: Yes / No

Mixer: Yes / No Screener: Yes / No

Repairs Needed? Yes / No ______________________________________

Temps: *Daily RFP Piles* / M,W,F all others Oxygen: M, W, Th

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

AR: ____________ Blower Running? Y or N Cycle Time: on _____ off _____

temps. O2

			East Side			
			West Side			

Windrow Notes: ____

____

____

Organics Tons Received

WM	DECC	Nordic	Grain	Hartel's	Sanimax					Total

Feedstock Delivered: Acceptable / Unacceptable **Pictures Taken?** Yes / No

Delivery Notes (time,contamination,etc.) _____

_____

_____

Site Maintenance:

Litter Picked up today? Yes / No

Pond Level? OK / Needs pumping # of Hours: _____

Snowplowing today? Yes / No

Windrow Work

Screening? Yes / No AR:_____ Screen Size: _____ # of Buckets: _____ Hours: _____

Rolled Windrows? Yes / No AR: _____ _____ _____ _____

Compost Sampling:

Sample taken first Weds of mo. from the last pile to complete PFRP. Yes / No

Sample moisture, bulk density, and pH the first Weds of each mo. From the fresh mix. Yes / No

Finished Compost Sample taken? Yes / No AR: _____ _____ _____

Random Bulk Density: AR: _____ = _____ AR: _____ = _____

Misc. Notes: _____

_____

_____

_____

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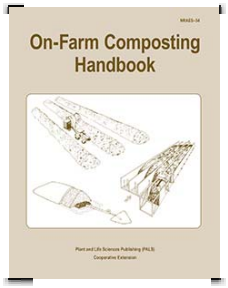

On-Farm Composting Handbook

Publication Number: NRAES-54
Cost: $25.00
Length: 186 pages
ISBN: 0-935817-19-0

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Product Description | News Release | Table of Contents

This publication was awarded a blue ribbon in the 1993 ASAE Educational Aids Competition.

This handbook presents a thorough overview of farm-scale composting and explains how to produce, use, and market compost. The information will be useful for farmers, waste producers, environmental regulators, and public health officials. Topics covered include benefits and drawbacks, the process, raw materials, methods, operations, management, site and environmental considerations, using compost, marketing, economics, and other options for waste management. Also included are 55 figures, 32 tables, calculations, references, and a glossary. (1992)

With increasing concern about the environment, composting has become an attractive option to turn problem materials and waste into a valuable product which can be returned to the land. The publication, On-Farm Composting Handbook, NRAES-54, presents a thorough overview of farm-scale composting and explains how to produce, use, and market compost.

The information is intended to help farmers decide whether composting or the use of compost is appropriate for their farm. For waste producers, environmental regulators, and public health officials, the handbook provides insight about agricultural composting and what it can reasonably accomplish. With this guide, those interested in a more effective means of waste management will be better able to plan and implement a farm-scale composting operation.

The On-Farm Composting Handbook is 186 pages long, with 11 chapters, 6 appendixes, a glossary, a suggested readings section, and a references section. The text is supplemented by 55 figures and 32 tables, as well as calculation examples, work sheets, and informative sidebars.

The 11 chapters cover the following topics: benefits and drawbacks of composting, the composting process, raw materials, composting methods, composting operations, management, site and environmental considerations, using compost, marketing agricultural compost, farm composting economics, and other options for waste management and composting. The 6 appendixes present the following information: characteristics of raw materials, equipment tables and manufacturers, troubleshooting and management guide, work sheets and forms, lists of state environmental agencies, and metric conversions. The glossary contains 150 words, and over 160 publications are listed in the references and suggested readings sections.

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