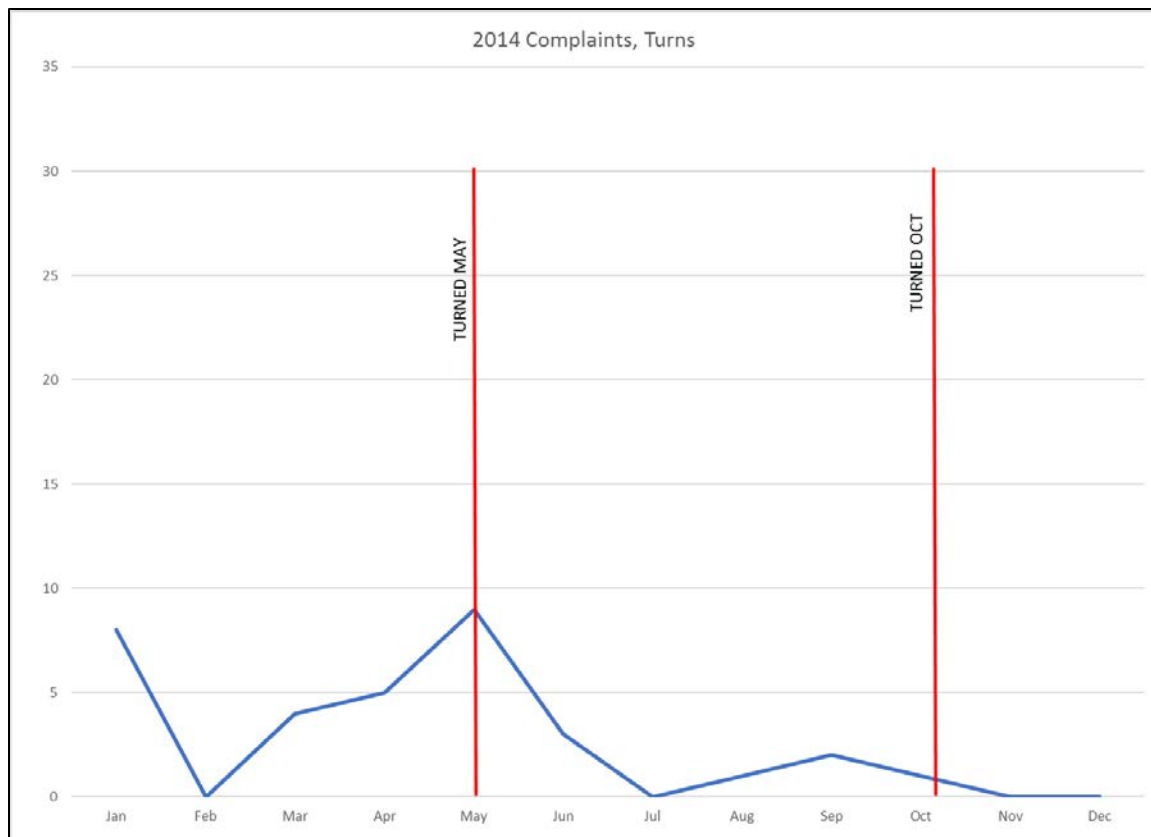
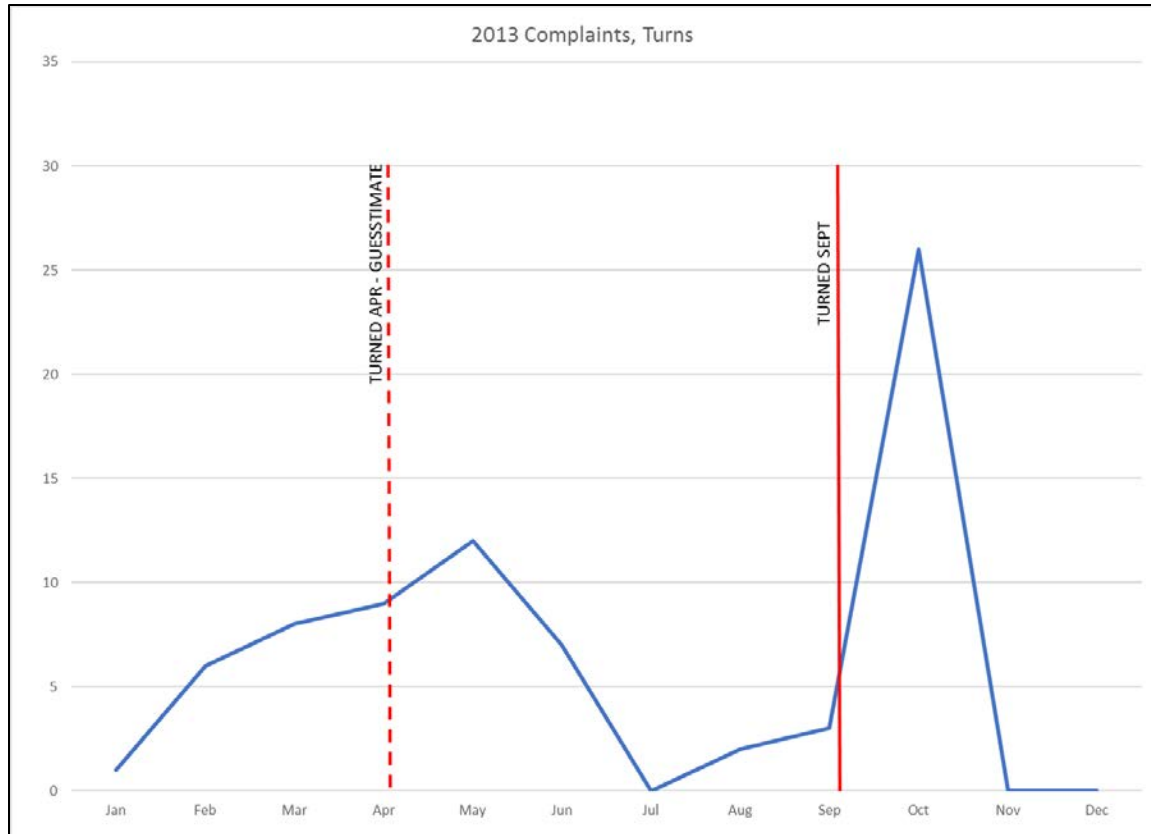


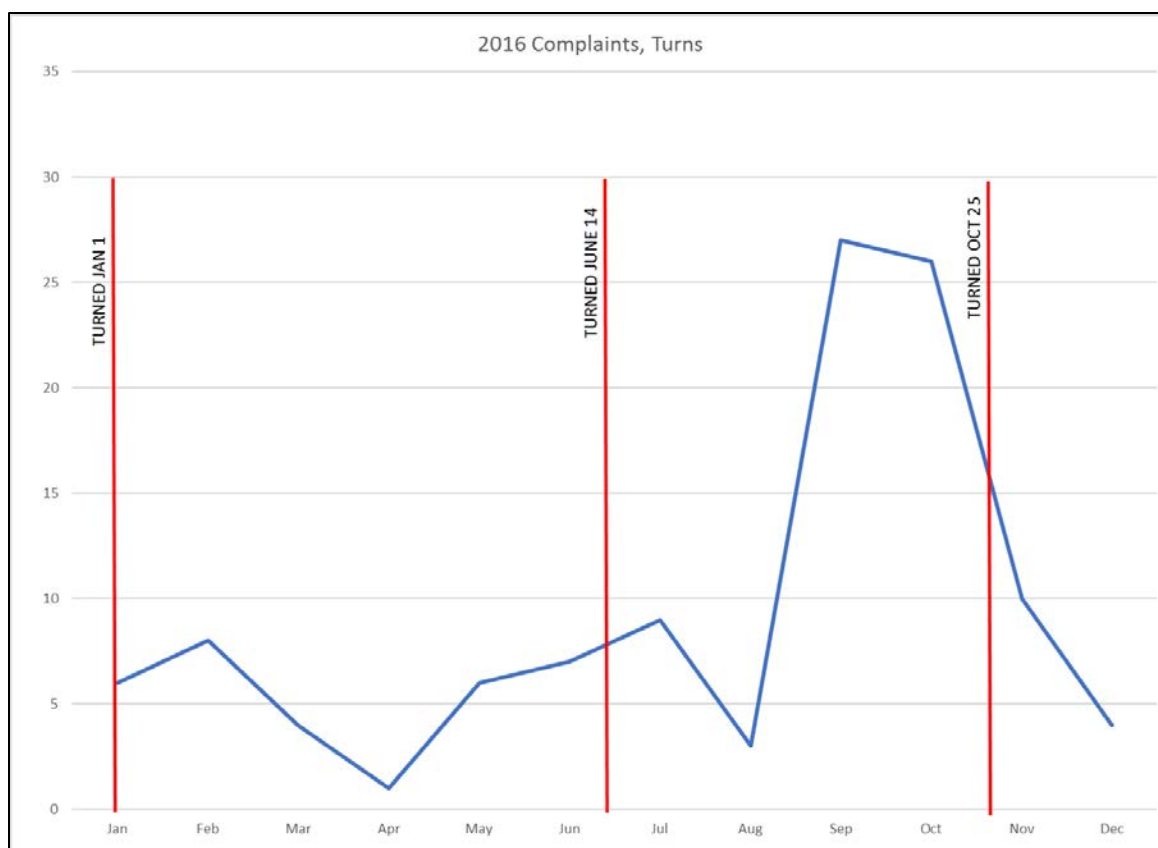
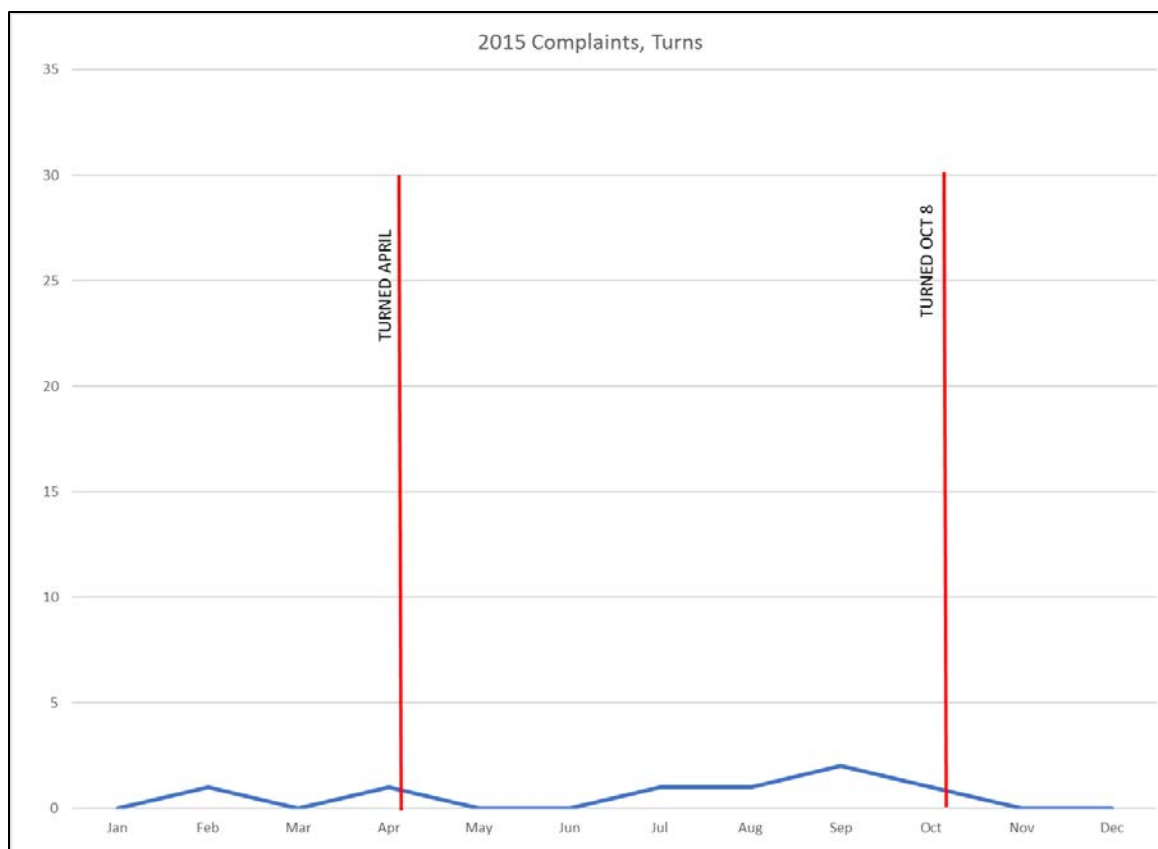
Appendix C - Community Experience

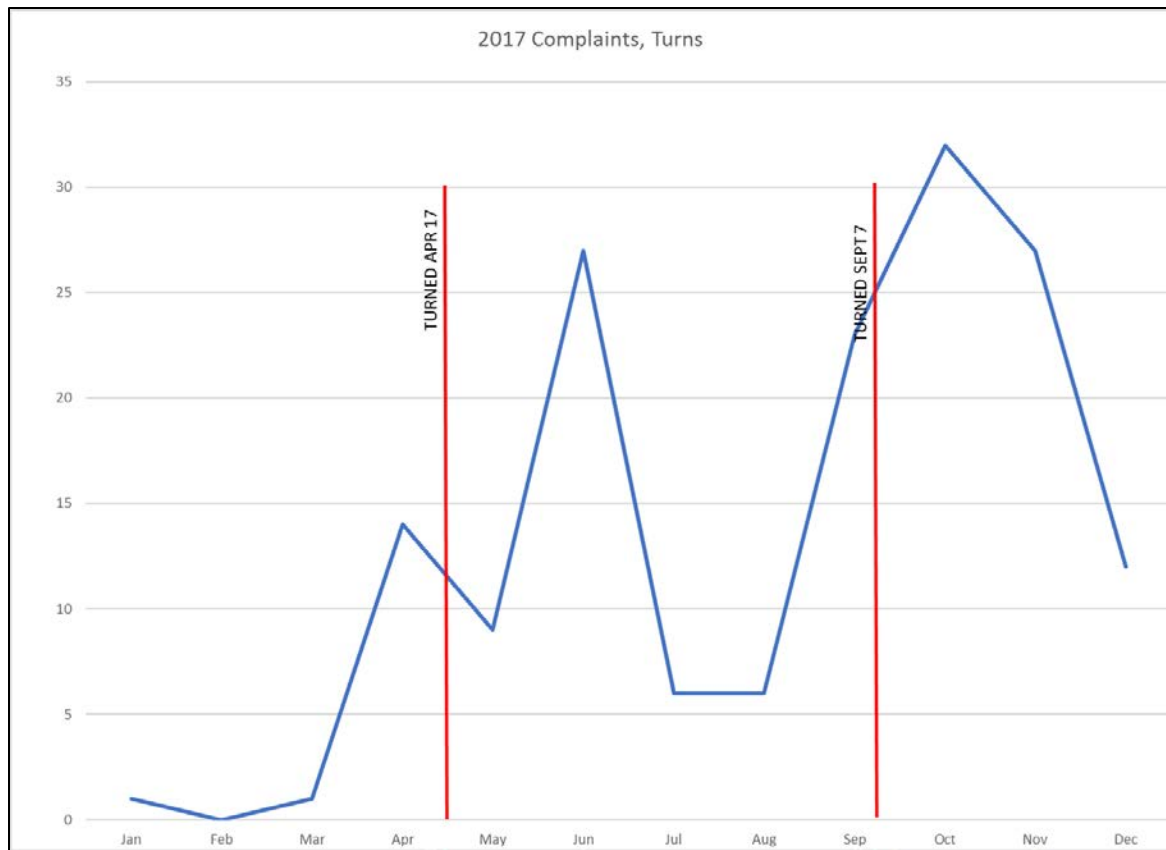
- C-1 Summary Odor Complaint Data Table
- C-2 Structured Interview Framework
- C-3 CASE position page
- C-4 Identity Stripped Interview data

C-1 ODOR COMPLAINT DATA



C-1 ODOR COMPLAINT DATA





INTERVIEW INTRODUCTION:

Good afternoon, M_ ____.

My name is Tamara Thomas. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sie-'poll) Road. We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

- Would you be so kind as to answer our questions and share your experiences of odors and other impacts from that facility?
- Do you have time for this right now or would you prefer to schedule another time to discuss?

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address:

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*)
3. Do you think you have a particularly discriminating / sensitive nose?
4. Do you experience odors from Grimm's Compost? **Please describe.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors?
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business?
7. Are you concerned about odors?
8. **If so, what are your concerns?**
9. Which odors are you most concerned about?
10. Are there odors that do not concern you? **Which ones – please describe?**
11. Do these odors affect your life / business? **How?**
12. **If yes, what have you done to adjust to living with these odors? What**

DATE / Time

activities do you differently or would you do differently if there were no odors?

13. How long have you lived at your current residence / place of business?
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business?
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? **Please describe.**
16. Do you experience any positive impacts from Grimm's compost business? **Please describe.**
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? **Please describe.**
18. Is there any other information you want to give us OR about any other locations? **Please describe.**

Clean Air Safe Environment

[CASE](#)[Our Position](#)[News](#)[Documents](#)[Report an Odor](#)[Contact](#)

We are CASE. We are impacted by DUST and ODOR from an industrial-scale static-pile composting operation owned and operated by Grimm's Fuel Co ("Operator") in Tualatin, Oregon.

We call for relief from this DUST and ODOR.

We demand Composting Done Right.

To remedy the **ODOR**, we request that the Operator:

- eliminate all anaerobic conditions in their composting process
- implement forced aeration windrow composting methods
- filter all airborne byproducts

To remedy the **DUST**, we request that the Operator:

- limit the height of the compost piles to 10 feet or less
- shroud all conveyor systems from wind
- filter all airborne byproducts

We Oppose:

- static pile composting
- offensive offsite odors
- offsite dust impacts

We Support:

- forced aeration windrow composting
- responsible business practices
- clean air and a safe environment

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION:

3-2-18 12:55pm voicemail

3-2-18 12:57pm e-mail

3-2-18 2:27pm call from M

Good afternoon,

My name is Tamara Thomas. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sip-'o-lee) Road.

We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

- Would you be so kind as to answer our questions and share your experiences of odors and other impacts from that facility?
- Do you have time for this right now or would you prefer to schedule another time to discuss?

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **PONY RIDGE**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*)
70s
3. Do you think you have a particularly discriminating / sensitive nose? **Not necessarily, more like usual people**
4. Do you experience odors from Grimm's Compost? Yes. **Please describe.**
Varies. Odor when turning differs from screening, differs from steaming. When turning its very hard to go outside. He recently found out it gets in his mustache! His mustache is smelly and the odor follows him everywhere. Cannot open window or doors. Trapped inside. Especially when windy it permeates your house. Difficult to get rid of it. If open up more comes in – so they just stay home with stink and smell. Sometimes smells like manure, occasionally like rotten eggs (according to Jeff Grimm's – that happens when doing mushroom compost). He thinks it smells like chemical sometimes – even though he knows its not a chemical. Actually he Loves the bark dust odor. That was attractive to him when he smelled the bark. This is not bark odor. Very stinky.
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **Wasn't here when they bought the house in 1998. After few years when he comes home noticed the funny smell, but thought it was a farm smell. Not serious. Then increases when realized it was from compost facility! Early on he didn't know and then they could not see it. Most serious odors began about 10 years ago. Didn't know where to complain or who to complaint to. When Metro announced they were giving them a new permit, he found out they could complain to DEQ. Over the last 7 years getting worse every year.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

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6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **Not every day. About 50% of time... sometimes 14 days in a row its bad and then nothing for one month. Not every emission is reported. It's sporadically reported – because not responded to or doesn't think it makes a difference. Reports do not reflect amount of odor impacts. DEQs complaint system is too convoluted to rely upon. Metro is very responsive and easy to communicate with.**
7. Are you concerned about odors? **Yes.**
8. If so, what are your concerns? **He thinks odors are indicative of toxins. Not sure. When you think about all the clippings and all chemicals put on grass, herbicides, fertilizers, etc. All those toxins are put into the air. He and his wife are allergic. He thinks that's a concern but doesn't know because has not been tested. They should have air permit according to DEQ but for some reason they do not have.**
9. Which odors are you most concerned about? **Yes, in general, concerned about all of them. For him, concerned about odor in general.**
10. Are there odors that do not concern you? Which ones – please describe? **Those that are known to him through nature are not a concern.**
11. Do these odors affect your life / business? How? **It prevents him from going out to do exercise and walking. Cannot do gardening. Even inside its awful to invite someone over. House smells like bad restroom/manure. [isolates them] Also gets dust. Especially in dry weather gets dust all over. If they park their car outside it gets dust all over car.**
12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? **He would not be mad/angry. Would feel he could have free will and could open windows. Life would be much more enjoyable if they could live life like anyone else. Sometimes they just leave house to mall to go somewhere else to be out of the neighborhood. Try to go somewhere else and come back at night. When turning, still have odors at night. Usually more relaxed on Sundays – but not always. Sometimes its better at night.**
13. How long have you lived at your current residence / place of business? **Since 1998.**
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? **Increased. There was a time they didn't even notice the odor. Now it's becoming more days that are smelly than there are not smelly.**
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? **Please describe. ODOR. Dust. Allergies – health issues. Worried about housing market now that everyone knows about the odors.**
16. Do you experience any positive impacts from Grimm's compost business? Please describe. **Yes, they love recycling/composting. Not against the business. Pro-composting, pro-recycling. But Grimm's needs a more modern way of composting. He wants to see a Fundamental change to operation. Not just cosmetic change. Static pile of 80-90-100feet is not acceptable. Wants it to fundamentally change. Anything else is just a band aid. Wants to see complete change in method. 20th century – time for 20th century methods of composting.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

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17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe.
Yes – see above.
18. Is there any other information you want to give us OR about any other locations? Please describe. Wish and expect from this initiation from Metro and GMT we hope the recommendations will relieve our neighborhood from this sense of smell. Our city is getting known for the odors. Being known as smelly city. They are proud of Tualatin – but now the odor is beyond City's boundary. We are hoping this will be remedied. We want them to stay.

Asked me:

About Nasal Ranger and how it works. Explained DT

If we are testing the air for mold. No

If we are testing for VOCs. Can I tell him about VOCs are they determined by feedstocks. Briefly told him types of VOC emissions varied depending on many factors including feedstocks, composting process, amount of oxygen in degradation process, amount of moisture in degradation process, distance from source, height and atmospheric conditions. Also, told him I seldom get involved in determining type of VOCs – too in depth for my typical experience.

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: 3-5-18 3:10pm

Good afternoon,

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sip-'o-lee) Road.

We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **KING CITY**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*) **30s**

3. Do you think you have a particularly discriminating / sensitive nose? Normal or slightly better

4. Do you experience odors from Grimm's Compost? Inside slightly outside a lot. Please describe. **Very sweet. Very similar to antifreeze - similar signature, sickly nauseous pretty prominent. Very noticeable. Smells like compost (not bark) very strong, sweet.**

5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **First in mid-January of 2018. Thought it was someone spreading fertilizer. Mostly in mornings and again very strong when they take dog for walk in evening. Went away for few days, then back even stronger. Feels like it gets progressively worse. 2-3 times per week (--) nearly every day (girlfriend).**

6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **Maybe once in blue moon Whereas now almost daily. Moved here 2-3 years ago. First noticed very faintly 3 years ago.**

7. Are you concerned about odors? **These definitely. Others – not really.**

8. If so, what are your concerns? **Concerned that they are not getting better – getting worse. Worried about health implications: They took their dog to vet because it was getting sick. Thought it might be from the odors.**

9. Which odors are you most concerned about? **There are different odors such as grass mowing in spring normal. This is only one that concerns him. He understands it correlates to when Grimm's turning occurs.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

10. Are there odors that do not concern you? Which ones – please describe? **Normal -not Grimms.**
11. Do these odors affect your life / business? How? **Taking dog to vet. Embarrassed to bring people to house. The odor is embarrassing. Makes it where they don't enjoy not walking in their neighborhood as much as they used to. There's a very nice park up the street, but now they drive to another park where odor is not strong. Concerned that this summer if odors are the same or worse they will lose use of their yard.**
12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? **See above.**
13. How long have you lived at your current residence / place of business? **3 years in sept.**
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? **increased**
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. **Positive that they take mulch from the neighborhood. Not enjoyable. Nuisance. Embarrassment. Makes him nauseous. Hopefully doesn't get worse and seep into house.**
16. Do you experience any positive impacts from Grimm's compost business? Please describe. **No – not sure. Doesn't know what they do with the compost.**
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. **Not sure – doesn't know what they do with the compost.**
18. Is there any other information you want to give us OR about any other locations? Please describe. **Would like to share that they are subscribed to a site called NextDoor. He brought up the question few months ago & got in touch with Wayne at Metro. Many people on this site have experienced the odors. It's a good resource if you look at specific comments in Next Door. There are even people with solutions for Grimms. People noticing the odor are relatively close to them but in other neighborhoods. He will share the comments and information with us if we are interested. People complaining as far as Durham and Bridgeport – suggestions of what they could do. Solutions. More than happy to take comments off of the site and send them to us. I responded thank you and I would like that information. Could I contact him at a later date to obtain that information. He understands the purpose and that composting is a good thing. But based on what he's read, Grimm's may be taking more materials now as well as the inversion which is contributing to odor not going up, but spreading locally.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: Email: 3-2-18 1:05pm Interview: **3-4-28 2:00 pm**

Good afternoon,

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sypole) Road.

We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **HAZELBROOK**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*) **40s**
3. Do you think you have a particularly discriminating / sensitive nose? **Yes probably – definitely able to determine and discriminate between different smells**
4. Do you experience odors from Grimm's Compost? **Yes. Please describe. Couple of different signatures – There is a rank rotting dead animal dirty smell – decomposition. Really revolting. Dirty. The other is like a chemical smell. It still has Grimms' signature – but this smells 'clean'. Lighter. Acetone / solvent – as well as a funky putrid sweet more like chemical odor. He hasn't tried to correlate to activities on site. The worst time is when really cold, when he walks out front door in morning. Hit like a wet towel. Like someone making coffee out of compost. Seems like more in evenings – after air cools off. [per email immediately after interview] When the stench is extreme (intense and concentrated) it creates in me an involuntary reluctance to breathe in. It is like being smothered by an invisible force. One a logical level I know that I must breathe in, but my instinct says NO. As if some primitive part of my brain has decided that it would be better to run low on oxygen than to risk taking in a lung full of that air.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **Since they moved here in 2010. When first moved in they noticed it maybe 9 days/ year.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **2017 – about 50x. They can go ~1 month or 2 with nothing then then forget about it... then can change to an entire week every single night.**
7. Are you concerned about odors? **Not the odor per se. But is concerned about what comes in with the odors. Compounds that might come along with the odor that may have health effects.**
8. If so, what are your concerns? **General health effect – its hard to know because they don't know what is in the emissions. He hasn't heard anything specific wrt health impacts. ON the day he was out on Pacific and met us (2-8-18) the next morning he woke up coughing up white thick mucus – more similar to asthma. Definitely respiratory irritant.**
9. Which odors are you most concerned about? **No – because they don't know what is in the off gassing from Grimms.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

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10. Are there odors that do not concern you? Which ones – please describe?
11. Do these odors affect your life / business? Yes. How? He works from home and has a contractor works there as well. Its unpleasant. She's noticed it and mentioned it and wonders if impacting her health. He likes to sleep with window open in the summer. Prefers fresh air vs air conditioner. He can't do that. Just knowing that another business is making him modify his behavior irritates him. He can't use his back yard, firepit or BBQ. He'll step out and say not tonight... the smell's too bad. H's lost the ability to use / lost the enjoyment of back yard.
12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? Having to keep windows closed is big one. Can't go out. Hasn't chased him out of his home – until the last event in February with the inversion. Then he was looking forward to getting out of area. Without odor would he enjoy back yard much more. They don't have parties at their house – they can't invite people to experience that odor. They can never plan that there wouldn't be the odor.
13. How long have you lived at your current residence / place of business? 2010
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? Increased. Steadily increasing except for the Feburary event which was 2x as bad as previous worst event. They have seen it every single year increased over the previous year. The next worst event, he cant remember exactly, maybe summer of 2017 – there were a number of them. He thinks the worst events for him are after a warm sunny day (not hot) mildly sunny, then sun goes down and it cools down leading to worst odors.
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. Brown dust on white car number of times. Doesn't know if its from Grimm's but doesn't look like normal dust. Little brown fibers/slivers on windowsills.
16. Do you experience any positive impacts from Grimm's compost business? Please describe. No
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. Yes, they divert green waste from landfill, recycled organics are a good thing, but the neighbors are paying cost of it. He should be compensated since his lungs are impacted and that should be a cost of Grimm's doing business. Grimm's should not be able to pass that cost and impact on to the community.
18. Is there any other information you want to give us OR about any other locations? Please describe.
 - He thinks if Grimm's modernized to avoid anaerobic conditions they could do just as much business without impacting neighbors.
 - Doesn't understand why they haven't upgraded methods the way other facilities have.
 - Odor reports to Metro forwarded are to Grimm's. Sometimes owner responded other times not. Before February, every other time he's responded the response was negative, minimizing the impact, denying there is an odor – way of dismissing concerns of the neighborhood. Doesn't feel like JG is taking ownership of the issue – He's not taking them seriously. This response has added insult to injury. He wishes Grimm's

GRIMM'S - ODOR & OTHER IMPACT SURVEY

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would take ownership of issue and fix it.

- During this Last odor issue (Febr with inversion) Grimms FINALLY sent out a response that acknowledged odor. The level of disproportionality between what Grimms says and -- actuality is high. Now he doesn't believe what Grimms says and doesn't care -- just wants it to stop.
- Brand new next door neighbor, from Beaverton, asked -- what smell is -- completely unsolicited. Neighbor said "Wow -- that's pretty strong". Validated -- experience. Also, the gradual nature of their experience (seems to worry him). Over the last year 3 elements have all increased: -- intensity when odor is noticed = smells worse. Duration, when they do smell it, its for a longer period of a day. Frequency has increased... many more times. These are all multipliers on his experience -- more than just adding to his discomfort.
- Personally, impact of smell is getting worse. He'd never smelled anything that made him nearly vomit before. But 3x all within last year he had that nauseous impact. 1 -- he was driving home from Sherwood on Tualatin Rd and 124th - he noticed the odor with windows up, then Rolled down window. X Gets through filter into car. 2 -- this year's event in early Feb between 5th and 9th inversion he smelled in house with doors closed and windows closed - He opened door to check and was so nauseated, he nearly vomited. 3 -- one other time, but he can't remember exactly. He thinks it was walking out of door.

One other thing he adds: The natural decomposition/decay in the woods has a natural smell. He has a compost pile in back yard -- doesn't smell. Grimm's is not like any of those natural smells. Don't seem to even be associated with compost. Seems to be associated with something else -- something dead.

I asked if he has ever bought Grimm's compost and if he knows if their finished compost smells the same as the odor he experiences or not. He has not bought their compost. He doesn't want to support that business -- He has spoken with people who have got diseased plants from using their compost. He also knows they have 2 grades of compost. One of his neighbors' landscaper uses it. They report the more expensive compost doesn't smell. The cheaper grade has "the odor".

FINALLY, he asked if he could suggest some ideas for them or if we have begun evaluating solutions. I told him, I would love to hear from him AFTER I completed the data collection. I felt it was important to keep an open mind and not try to brainstorm solutions prior to getting all the information. It helps to be able to collect and accurately portrait the situation if we have not previously determined that one solution or the other should be put in place. I told him I would e-mail him on the 26th because by then we should have all our data collection completed and would be in solution mode. Anything he wanted to suggest at that time we would be very interested to hear.

March 27, 2018 11:35am

Open ended conversation turned into him asking lots of questions about composting and how we will evaluate whether the facility should do something or not.

His CASE group [Clean Air: Safe Environment] is working with Chad Darby / Env consultant who brings up anaerobic conditions as root cause of stink. Group has gone to Nature's Needs and is very impressed with their system. Negative aeration concentrated in collector pile fed into

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biofilter concentrated into that system. Almost no smells even off site – only odors are nice foresty woodsy odors. He asked why anyone would use any other system?

I described other systems and told him about variability of each compost facility, site, feedstock, weather, etc.

He also asked about where other positive aeration systems might be that they could visit. I gave him Bailey Compost, Snohomish, Cedar Grove/Gore Everett, LRI/turned asp, North Mason Fiber, Belfair.

He wanted to know what we will use to evaluate whether something needed to be done or not. I told him we'd be looking at the criteria in our scope – to ask Hila for copy of RFP. He asked about health impacts. I said I didn't know if anyone was looking into that.

He wanted to know if No Action was an alternative. His group would be very skeptical and offended if that was considered part of the options. I said that decision would be made with our team and Metro, but that including a No Option alternative to compare against was typical practice for such evaluation, but that we would discuss it.

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: **3-26-18 3:10pm**

Good afternoon, El Dorado Mobile Village, works there. Lives at

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sie-'poll) Road.

We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

- *Would you be so kind as to answer our questions and share your experiences of odors and other impacts from that facility?*
- *Do you have time for this right now or would you prefer to schedule another time to discuss?*

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address:

Explain that this survey is specific to that location only. If they have

anything to add about other locations, we will take that information at the

end. 2. Request age decade (explain this is only to ensure we interview people of varying ages)

- 70s
3. Do you think you have a particularly discriminating / sensitive nose? Fairly sensitive.
4. Do you experience odors from Grimm's Compost? **Not all the time. When they're burning. People told her they burned stuff there. Like compost.** Please describe. **Don't do it that often. Once in awhile. Smells like dog poop, sometimes smells like sewer. About once a month or 2x per month. Smells for a day or 2 – sometimes 3 – usually 2 days.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **Been here since 2004. Noticed it since 2004. Just a strong odor.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **About 2-3 days at least 10-15 days at least. Like something rotten. Doesn't smell like smoke.**
7. Are you concerned about odors? **Has always been concerned about it. She just thought it was something she would have to accept. When she smells it, she just stays**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

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- in the house and doesn't go out. Doesn't burn your eyes.
8. If so, what are your concerns? *She's older. Could catch something. Like getting cancer or something. Because she's 76. Thinks she's healthy but doesn't know.*
 9. Which odors are you most concerned about? *Always the same odors. Not different. Nothing visible.*
 10. Are there odors that do not concern you? Which ones – please describe? *Just the one that she really smells. The one from Grimm's. She has a bad smell. She can tell gasoline or something. But if she can smell it, it's really bad. She has asthma. Has a bad smell.*
 11. Do these odors affect your life / business? *No. How? Just still goes on.*
 12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors?
 13. How long have you lived at your current residence / place of business? *Lived here since 2004.*
 14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? *About the same. Still last 1-3 days usually about 2 days.*
 15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. *No other impact or notice.*
 16. Do you experience any positive impacts from Grimm's compost business? Please describe. *No. She hasn't worked there. Supposes it's a good garbage facility. Good land fill for putting stuff there. People here used to take leaves & stuff to there. Its close, which is good.*
 17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. *Probably helps people clean up. People dump there. Probably helps people who dump there. Like nurseries across the road from them.*
 18. Is there any other information you want to give us OR about any other locations? Please describe. *It would be nice if it didn't smell so bad. Didn't smell like – like garbage. Would like it better if it didn't smell so bad.*

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: **3-27-18 3:00pm**

Good afternoon, /Office manager

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sy-'poll) Road.

We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **TUALATIN** *Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.*
2. Request age decade (explain this is only to ensure we interview people of varying ages) **late 20s**
3. Do you think you have a particularly discriminating / sensitive nose? **No average**
4. Do you experience odors from Grimm's Compost? **Yes.** Please describe. **Really just like bark dust. Not a regular issue – more summer time. When its hot or exceptionally windy or dry, she notices it most. Doesn't notice it during fall or winter. I asked if she noticed it in February. She said "for a couple of days, but not exceptionally bad or long.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **5 years. Since she started working there.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your business? **Less than 20.**
7. Are you concerned about odors? **No.**
- ~~8. If so, what are your concerns?~~
- ~~9. Which odors are you most concerned about?~~
- ~~10. Are there odors that do not concern you? Which ones – please describe?~~
11. Do these odors affect your business? **No.** How? **She lives about 3 miles away and can smell it there as well, but it doesn't bother her. Sherwood, OR. She does notice the odor at home, but it doesn't bother her. Notices it more at work for sure. She's lived there 2 years. Way less than 20 days per year there.**

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~~12. — If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors?~~

13. How long have you been at your current place of business? **5 years**

14. Have the odors increased, decreased, or remained the same during your tenure at your current place of business? **Remained about the same.**

15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. **Sometimes because you can see dust over the facility. I asked if she ever got it on her car. She said "never". Not enough to get on the car.**

16. Do you experience any positive impacts from Grimm's compost business? Please describe. **No – She has an extremely neutral opinion of that business. She understands that it's a compost business and will have some smells, but – so what? Its part & parcel of being in Oregon and being next to a facility. Maybe there are environmental impacts that she should care about more.** I then told her there were opinions all across the board. Positive and negative. She was surprised there was anyone super positive. We finished the interview then I told her about the gardener in Hazelbrook.

17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. **No.**

18. Is there any other information you want to give us OR about any other locations? Please describe. **She just thinks that they are along a busy highway. There is definitely more traffic as more residences are built and everything in fills. People don't get it that as you get more rural you have other things next door. In other areas or nearer Portland you could have papermill or steel mill or something. So, there are all kinds of different factors.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: **3-26-18; 10:20am**

Good morning / afternoon,

My name is _____. *I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sie-'poll) Road. We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.*

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **PONY RIDGE**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*) **70**
3. Do you think you have a particularly discriminating / sensitive nose? **Yes.**
4. Do you experience odors from Grimm's Compost? Please describe. **Oh yes! Most of time it smells like sileage – or sometimes smells like heavy bark dust, sileage, sewage once in awhile. Just awful.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **Moved here Sept 2016. Did not know anything about the odor. About 1 week after moving here she noticed, kept smelling the smell. Its gotten worse over time. Piles have got much higher at about the same rate the odors have increase. During the inversion earlier this year was just awful. Her allergies are worse here than they have ever been. Her husband has allergies now. When she goes outside to work, her breathing gets a little funny. They have dogs as well. Doesn't know if this is affecting their health as well.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **At least 90% of the days. She smelled it most of the year. There isn't hardly any time of the year that there is no odor. Especially, during the inversion it was horrible! At least over... She started putting the days down (that she noticed the odor), but hasn't been feeling well and hasn't done it. She recently had a pacemaker put in. She never had high blood pressure, but she passed out just sitting in her home. The odor has been worse since December. They put bark chips on top and didn't make any difference. They don't want them to stop business, just**

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change method they are using. She doesn't know if maybe her heart issue was impacted by the odors.

7. Are you concerned about odors? **Yes.**

8. If so, what are your concerns? **She's concerned about the health issues of these odors. What are the particulates in the odors? What are the materials that are in the odors that are causing health issues? They get nauseated from it. Not always. But they do get nauseous. She's very healthy, athletic, but recently had to have pacemaker installed. She doesn't know if this is something which has hurt her or not.**

9. Which odors are you most concerned about? **There are different odors. They all concern her the same health-wise.**

10. Are there odors that do not concern you? Which ones – please describe? **Not from Grimms.**

11. Do these odors affect your life / business? How? **Yes.**

12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? **She doesn't walk. She doesn't walk as much because of the odors. She has to walk the dogs, but they go in their run now rather than taking long walks. She gets nauseated when outside. She can't stay outside as long to work in the yard. Sometimes the odors are so heavy, its kind of hard to breath.**

13. How long have you lived at your current residence / place of business? **Sept 2016. No one even said anything about odor when they moved in. She didn't know it was that bad even though they knew Grimms was there. They bought products from them when they lived in their other place. They downsized from a larger home to this mobile home cours. You can see the pile when you drive down the road. They love it here, but don't like the smell.**

14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? **Increased. Over the last year the pile has got much higher. Nearly 80-feet! And the fire department rule is less than 24-feet!**

15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. **No noise. Another thing they impact is the traffic on Cypole & 99. Traffic backs up really bad from people coming into the facility. It's a short light. Especially bad in the morning when there are busses.**

16. Do you experience any positive impacts from Grimm's compost business? Please describe. **No. She personally doesn't get anything from Grimm's being there. She doesn't use their compost or bark. Mr. Grimm is nasty to us. Doesn't want to do anything about**

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the odors. He just says there's nothing there and just puts all kinds of bad information out there. Metro want's them to stay because it's a business. She is OK with keeping a business, but they need to change.

Other facilities have changed. North Hill does things differently. Why can't Grimms? She doesn't know how their workers do it. Hey, Mr. Grimm, why can't you change this?

17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. She is sure they are doing things for people but she doesn't know exactly.

18. Is there any other information you want to give us OR about any other locations? Please describe. She would like to see something done. It's taken way too much time to get this done. He has a temporary permit since the end of the year. They've had some people who have left because they cant take the odor. She doesn't want to leave. But it's taken way too long to fix it. Mr. Grimm doesn't want to talk to us. Had community meeting. He brings his workers in and won't talk with us. One of the workers said he works there and his kids don't have 6 toes & 9 fingers. It was kind of humerous. (...but felt demeaning. – my words interpreted from her description).

Is there odor right now? Very slight, smells like bark dust a little, but hardly anything at all.

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: 3-16-18

Good afternoon,

My name is _. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sic-'poll) Road.

We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **PARK**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*) **40s**
3. Do you think you have a particularly discriminating / sensitive nose? **Yes – he calls it bionic**
4. Do you experience odors from Grimm's Compost? **Yes** Please describe.
Moved up 4 years ago – within the 1st week noticed smell in air. Not particularly unpleasant, but definitely noticeable. He used to work in essential oils. Finally put his finger on the similarity. It smells like rancid Shea butter. When shea butter spoils, becomes rancid, it has particularly acrid smell. Over time it has become more present – not constant, but can smell it perhaps more often. Is rancid-like odor. Wife was concerned that it was chemical. But he said, No it was more organic. He doesn't find it offensive because he has driven through Nebraska and the farms in the mid-west. He knows how bad it can get. The odor is often present, and when it is, it is inescapable. But he is not concerned about it.
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **4 years,**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **30-60 days per year. More present certain times of year.**
Spring & autumn.
7. Are you concerned about odors? **No**
8. If so, what are your concerns?
9. Which odors are you most concerned about? **NA**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

10. Are there odors that do not concern you? Which ones – please describe? **NA**
11. Do these odors affect your life / business? **No –How? But he hasnt tried to sell the house – doesn't know if it would reduce its value or slow a sale. For 4 years he didn't know exactly what it was. There is a lot of agriculture and landscapers and industry nearby. He thought it was bark dust. Not until couple months ago when everyone was talking about it and then I called to set up an interview that he discovered it was likely Grimm's.**
12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? **NA**
13. How long have you lived at your current residence / place of business? **4 years**
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? **Have been about the same, or maybe small increase. Anecdotally, has noticed other people commenting much more about it. Keep in mind that Pacific foods is very close and makes packaged food – soups, etc that come in aseptically packaged, etc., there are several industrial bakeries nearby that also emit odors.**
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? **No. Please describe.. He's sure they are an employer of neighbors, He's an avid gardener and respects the business that they provide. He loves his compost pile. Sees Grimm's trucks all over working on commercial & residential projects. He has nothing negative to add.**
16. Do you experience any positive impacts from Grimm's compost business? Please describe. **Doesn't have any, but would like to suggest that they donate compost to their school garden. He's in charge.**
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe **See above.**
18. Is there any other information you want to give us OR about any other locations? Please describe. **Nothing else, other that he understands what Grimm's is doing. They are a large operation handling lots of material and the smell is not offensive to him.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION:

Good afternoon,

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sip-'o-lee) Road. We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **HAZELBROOK**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*)
60
3. Do you think you have a particularly discriminating / sensitive nose? **NORMAL**
4. Do you experience odors from Grimm's Compost? **RARELY, ONCE OR TWICE PER YEAR.** Please describe. **Smells of decomposing yard waste. He has been involved in agriculture for many years. He recognizes that handling materials can have some odor. For example silage generates an odor. Difficult to describe the odor. Is it like silage? It depends on what kind of silage. No. hesitates. I guess 'pungent' would be a way to describe it.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **Lived here 27 years. Only noticed few times. First time identifying the odor was not at house, but when driving by. First time at residence was probably about 20 years ago.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **1 or 2 times. Its more apt to be apparent in hot weather when wind was coming from that direction. Very infrequent.**
7. Are you concerned about odors? **No not at all**
8. If so, what are your concerns? **na**
9. Which odors are you most concerned about? **na**
10. Are there odors that do not concern you? Which ones – please describe? **na**
11. Do these odors affect your life / business? **How? No**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? na
13. How long have you lived at your current residence / place of business? 27 years
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? Remained about the same. So much can vary depending on weather. If you're having a wet summer it doesn't smell as much. Wet conditions tends to knock odors down. Under very hot conditions, more noticeable.
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. Finds it a very useful facility. Recently a neighbor had tree taken down. He (--) cut entire tree down, and cut it into log pieces. But the small branches were way too many to handle in the yard waste bin. Loaded it up and took it to Grimm's! When he was there at the facility there was a bit of odor and it is natural that there is some odor is to be expected.
16. Do you experience any positive impacts from Grimm's compost business? Please describe. Yes, allows them to get rid of debris that would have sat around and possible harbored pests –“ allows us to keep yards and homes on much tidier basis. Last winter lots of trees came down. He went and spent \$1500 on a chipper/shredder to handle that, but lots of people cant afford that. And \$1500 vs \$20 on a trip to Grimm's is important. It's a great convenience. Also he's bought lots of compost, and bark dust over the years. It has a small odor that quickly dissipates. Always odor dissipates within 24 hours.
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. Employment, he sees lots of landscape people dropping off debris whenever he goes there. Local businesses are dependent upon this facility. Its well located. Negative impacts of pollution associated with long distance travel or illegal dumping if they were not there. He's lived in the area >60 years. Another impact, if Grimm's wasn't so convenient and inexpensive there would be temptation for illegal dumping. Grimm's minimizes the temptation to do something illegal.
18. Is there any other information you want to give us OR about any other locations? Please describe. When he considers Grimm's, there are other places that would take this kind of materials. Grimm's is least expensive and very convenient for him, Its well situated and has very easy and very good access and same goes for buying compost. Good location good services and good for the environment.

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: 3-28-18 1:35pm

Good afternoon, Office Manager:

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facilityBar, which is located at the corner of 99 West and SW Cipole (sie-'poll) Road.

We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas.

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **Herman Rd**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*)
60s
3. Do you think you have a particularly discriminating / sensitive nose? **Pretty normal. He can smell things.**
4. Do you experience odors from Grimm's Compost? Please describe. **No. never noticed it being bad. Has smelled Grimm's but usually when driving by.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **NA**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **NA**
7. Are you concerned about odors? **Yes, if it was persistent.**
8. If so, what are your concerns? **Annoying. Then he'd be concerned about what it was. What type of gasses – just to know if it was anything harmful.**
9. Which odors are you most concerned about? **Yes – more worried about those that would be harmful.**
- ~~10. Are there odors that do not concern you? Which ones – please describe?~~
- ~~11. Do these odors affect your life / business? How?~~
- ~~12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? NA~~
13. How long have you been at place of business? **Been in this location since 1990. He's been there the whole time. Never noticed anything.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? **NA**
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. **No.**
16. Do you experience any positive impacts from Grimm's compost business? Please describe. **Nothing at all.**
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. **Unknown. To get rid of yard debris. Used to be backed up to Grimm's. Nothing that great about it, but no negative impacts either.**
18. Is there any other information you want to give us OR about any other locations? Please describe. **Not really. Before all the roads were put in they were backed up to Grimm's, but still no notice of an odor. They're close but divided by road. Never noticed any time when he walked outside and noticed it smelled like Grimm's.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: 3-29-18 1:00pm

Good afternoon, M_

vml 3-26-18 1:15pm. eml 3-26-18 1:25pm.

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sie-'poll) Road. We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **TIGARD**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*)
late 30s
3. Do you think you have a particularly discriminating / sensitive nose? **Yes.**
4. Do you experience odors from Grimm's Compost? Yes believe so. Please describe. **She lives near WWTP in Tigard – smells the sewage odor from there occasionally. This is different. This smell is sweeter, dirty diaper smell. Bark dust. Manurey. Much heavier smell versus sewage smell is wafting, lighter smell. Heavy. Pretty identifiable – the reason is she first noticed it, then a few weeks later she noticed people were talking about it. They encouraged people to call in if they smelled it, so she did. She lived here from 2005 to 2012, then moved away. Then moved back into the same house the summer of 2016. Didn't smell it / notice it when she lived here before. Then, since she's been back really only 2-3 days in past 2-3 months. Didn't notice it before.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **Less than 6 months.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your residence / business? **Not more than 3 days.**
7. Are you concerned about odors? **Hmmmm. Thinks... Difficult question. She waffles between worrying about everything (natural worrier) then to worrying about nothing. We're all going to die. If it happens more than it has been, then she would be concerned about it. If she smelled it every day or 1x per week, she would also be concerned. It's not great, but it seems to pass. She commented because it was so**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

distinct, she felt sure it was the same odor everyone was talking about. 1x /month wouldn't be a problem for her versus 1x /week. Even on days when it was bad was only for few hours.

8. If so, what are your concerns? **Personal level: because she has strong sense of smell it would be bothersome. Generally: because she knows its coming from a compost system rather than a chemical plant... She understands that its not a toxic... it's a natural smell. Is it toxic? Depends on dose. Worried that it's unhealthy. The other thing that concerns her is that she has Air BnB guests and doesn't want a bad review. If it's a common thing then her house value goes down.**
9. Which odors are you most concerned about? **Grimm's**
10. Are there odors that do not concern you? Which ones – please describe? **WWTP odors bother her, but don't concern her. She's slightly more concerned because its much further away and she doesn't think it should come that far. There must be a problem. It's a heavier odor that stays longer.**
11. Do these odors affect your life / business? How? **Yes.**
12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? **She stays inside when she notices it. She's not a great outdoor person anyway. She doesn't bring her kids in when she smells it. But it hasn't happened in summer when she is outside. If it did she would change her behavior.**
13. How long have you lived at your current residence / place of business? **1.5 year.**
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? **Increased slightly.**
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. **No. Doesn't know anything about it. Composting is a good thing. She's glad they are composting.**
16. Do you experience any positive impacts from Grimm's compost business? Please describe. **No.**
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. **Doesn't know.**
18. Is there any other information you want to give us OR about any other locations? Please describe. **No, covered it all.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: 3-27-18 3:40PM not open: OPEN W-SU 10-7PM; **Interview 3-28-18 3:00pm.**

Good afternoon, 3:00. My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (sie-'poll) Road. We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take 15-20-minutes if you are willing to participate.

- Would you be so kind as to answer our questions and share your experiences of odors and other impacts from that facility?
- Do you have time for this right now or would you prefer to schedule another time to discuss?

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **CIPOLE**
97062 Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.
2. Request age decade (*explain this is only to ensure we interview people of varying ages*)
50s
3. Do you think you have a particularly discriminating / sensitive nose? **Yes**
4. Do you experience odors from Grimm's Compost? **Yes** Please describe. **Smells like decomposing mulch. Rotting materials.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **Only been there 1 year. Business has been there 3 years. She's smelled it the whole year. Smells if the wind is blowing in right direction. They have to keep shop doors closed to keep odor out.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your business? **Depends on which direction wind is blowing.. Totally depends. Probably 10-15 days per month.**
7. Are you concerned about odors? **Hadn't thought much about it. It is what it is since were right next door. Took it in stride. Not really.**
8. If so, what are your concerns? **NA**
9. Which odors are you most concerned about? **The odors are pretty much always the same. Doesn't change much. Just decomposing debris.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

10. Are there odors that do not concern you? Which ones – please describe? **NA**
11. Do these odors affect your life OR business? **They don't affect the business per se, but if they want to open the bay door and the wind is coming from their direction they keep it shut to keep the odor out.**
12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? **Not much really. Obviously, if the door was open for air circulation it would be better, but other than that not really. It's a nice day here today – Its sunny and the wind is to the other direction.**
13. How long have you been at your current place of business? **1 year.**
14. Have the odors increased, decreased, or remained the same during your tenure at your current place of business? **Over this last year, its remained about the same.**
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? Please describe. **Probably not – The only other thing is they're – located right next to a wetlands. You can hear geese flying over right now. She's concerned about if any of the material is leaching into the wetland.**
16. Do you experience any positive impacts from Grimm's compost business? Please describe. **No.**
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. **They provide a valuable service for the community. Offer compost bark dust that people need. Have yard debris drop off. Provides local service for community so people don't have to drive along way for that.**
18. Is there any other information you want to give us OR about any other locations? Please describe. **Nothing.**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

INTERVIEW INTRODUCTION: **3-16-18 ~2:00pm**

Good afternoon,

My name is _____. I am working with Green Mountain Technologies, who has been contracted with Metro to investigate and assess the community impacts from Grimm's Fuel composting facility, which is located at the corner of 99 West and SW Cipole (Sy'-Pole) Road. We have reviewed complaint records and now are attempting to build an in-depth and accurate picture of individual experiences representing specific areas. This conversation may take from 30- to 60-minutes if you are willing to participate.

- Would you be so kind as to answer our questions and share your experiences of odors and other impacts from that facility?
- Do you have time for this right now or would you prefer to schedule another time to discuss?

DRAFT INTERVIEW QUESTIONS:

1. Please verify your address: **Sherwood,**

Explain that this survey is specific to that location only. If they have anything to add about other locations, we will take that information at the end.

2. Request age decade (*explain this is only to ensure we interview people of varying ages*)
- **20s**
3. Do you think you have a particularly discriminating / sensitive nose? **Yes -**
4. Do you experience odors from Grimm's Compost? **Yes.** Please describe. **Earthy, old. Like compost that has been done a little wrong (because you shouldn't smell it if right) or probably because there's so much of it. Old earthy, not garbagy (she used to live by a landfill). More musky not sharp. Intensity varies sometimes pretty strong. Not often very strong – maybe 3-4 days per year.**
5. If yes, how long (i.e. for how many years / months) have you been experiencing these odors? **3 years. All 3 years.**
6. If yes, approximately how many days over the last year [January through December 2017] have been affected at your business? **~24 about 2 days per month**
7. Are you concerned about odors? **No.**
8. If so, what are your concerns? **NA**
9. Which odors are you most concerned about? **NA**
10. Are there odors that do not concern you? Which ones – please describe? **NA**
11. Do these odors affect your life / business? How? **No. Does habitat restoration –**

GRIMM'S - ODOR & OTHER IMPACT SURVEY

outside a lot of time. Moderate interaction with visitors, but not main part of her job. Has had a couple people mentioned they smell it but not that they were concerned about it – just asked what it was.

12. If yes, what have you done to adjust to living with these odors? What activities do you differently or would you do differently if there were no odors? **NA**
13. How long have you lived at your current residence / place of business? **3 years.**
14. Have the odors increased, decreased, or remained the same during your tenure at your current residence/place of business? **Remained the same.**
15. Do you experience any other issues or impacts from Grimm's compost facility – positive or negative? **No.** Please describe.
16. Do you experience any positive impacts from Grimm's compost business? Please describe. **No – doesn't know anything about it.**
17. Does Grimm's compost provide any positive impacts to your community? Such as employment, compost for soil restoration, property value, local ownership/management, community support or involvement, other? Please describe. **No opinion – has "no idea what Grimm's is".**
18. Is there any other information you want to give us OR about any other locations? Please describe. **None.**

Appendix D - Air Quality Data

- D-1 Dilution/Threshold Data
- D-2 Pile Emissions Data
- D-3 Odor Characterization Wheel

GPS Coordinates

#	Date	Time PST	IST on iPhone	Easting	Northing	Location Description	DT	Odor description	Comments
1	1/31/2018	8:41	10:11 PM	45.39528	-122.79878	River bridge	7	Woody Tobacco	
2	1/31/2018	8:53	10:23 PM	45.39239	-122.80478	Park river walk	7	Occasional Whiff of woody compost tobacco smell very strong odor of woody anaerobic high pinene, terpene with tobacco	Winds 250-330 fpm ESE
3	1/31/2018	9:01	10:31 PM	45.38567	-122.818654	SW Pacific Drive and Cipole	15		
4	1/31/2018	9:15	10:45 PM	45.385	-122.81695	SW Pacific Drive and Cipole	4		
5	1/31/2018	4:07	5:37 AM	45.383041	-122.814289	Pile 1 top probe	15		
6	1/31/2018	4:26	5:56 AM	45.383041	-122.814289	Pile 1 top Tub	≥60	Citrus	
7	1/31/2018	4:36	6:06 AM	45.383041	-122.814289	Pile 1 top tub	30	rotting logs	
8	1/31/2018	4:41	6:11 AM	45.382951	-122.814489	Pile 1 top edge	30	burning smell	
9	1/31/2018	5:06		45.383662	-122.814774	Pile 2 tub	30	oily rag terpene smells	
10	1/31/2018	5:16		45.383662	-122.814774	Pile 2 tub	30		
11	1/31/2018	5:21		45.383662	-122.814774	Pile 2 tub	≥60	Chem paint thinner	
Weather: Hazy, Foggy til ~11am, light overcast. Wind direction: W-SW/variable. Wind Speed: calm to light breeze (1-5mph)									
12	2/7/2018	10:54		45.38332	-122.757	Starbucks	15	molasses, sweet dirty socks w/green grass	
13	2/7/2018	11:06							fog lifting / slight breeze N
14	2/7/2018	12:28		45.38732	-122.814686	18295 SW133rd	ND	complaint location	light breeze W
15	2/7/2018			45.386847	-122.811062	Pacific Way @ /sw 130th	2+	detected while driving	
16	2/7/2018	12:39		45.39127	-122.794	11430 Kalispell	7	sicky sweet, woody, bark	--Waypt 002
17	2/7/2018	12:45		45.390953	-122.793659	17825 SW 114th	15		
18	2/7/2018	12:47		45.390222	-122.792925	113th	30	silage, bitter, dirty sock undertones	
19	2/7/2018	12:51		45.390233	-122.792165	11215 SW Apache	7	green grass / dirty socks	
20	2/7/2018	12:59							
21	2/7/2018	1:03		45.391276	-122.794308	11430 Kalispell	4	dirty socks, grass	~3mph breeze (0-450fpm)
22	2/7/2018	2:20		45.3835	-122.815	On Top turning piles: Pile 3	≥60	dirty socks, fruity, sweet	odor too intense. Nose worn out.
23	2/7/2018	2:40		45.3835	-122.815	Pile 3 - NE corner	≥60	conifer/green/dirty socks slightly	estimated
24	2/7/2018	3:10		45.38343	-122.81426	Pile 2 - E Edge	≥60	garbagy/methane/woody	estimated
25	2/7/2018	turning pile.	Levels all equalled or exceeded 60 D/T				≥60		
26	2/8/2018	7:00:00 AM		45.38332	-122.757	Starbucks	-		Odor identifiable. Very different conditions from yesterday.
27	2/8/2018	7:36		45.39482	-122.80025	TVFR	-	no identifiable odor	heading west on 99W
28	2/8/2018			45.386822	-122.811137	SW Pacific Drive	nd		
29	2/8/2018			45.386352	-122.81456	133rd	nd		
30	2/8/2018	7:44		45.38236	-122.81675	Loen Nursery	nd		
31	2/8/2018	7:52	9:22 PM	45.38287	-12280809		nd		

GPS Coordinates

#	Date	Time PST	IST on iPhone	Easting	Northing	Location Description	DT	Odor description	Comments
32	2/8/2018	8:02	9:31 PM	45.38092	-122.81297	133 rd 1st	nd		
33	2/8/2018	8:10	9:43 PM	45.38478	-122.80669	drive around to Eside of pile	30		
34		8:18		45.38512	-122.80682		15		
35	2/8/2018	8:21		45.38512	-122.80682		15		
36	2/8/2018	8:24		45.38512	-122.80682		0		
37	2/8/2018	8:28		45.38512	-122.80682		7		
38	2/8/2018	8:30		45.384793	-122.804382	NE corner Property	nd		
39		8:39		45.38449	-122.80804		0		
40	2/8/2018	8:43		45.384793	-122.804382	NE corner of Property	<2		
41	2/8/2018			45.382906	-122.804552	124th Eline of Propertyline	<2		
42	2/8/2018	8:45		45.382475	-122.80486	corner Anode/E propertyline	<2		
43	2/8/2018	8:48					0-15		
44	2/8/2018	8:56		45.38574	-122.80365	124th high pt	nd		
45	2/8/2018	9:02	10:33 PM	45.38173	-122.79897	118th E of	2	slightly swampy/septic	
46	2/8/2018	9:09		45.382009	-122.796752	Shultz clearwater sanitary		septic	steam cleaning portable toilets
47	2/8/2018	9:12				118th S of Herman	2		
48	2/8/2018	9:18					nd		
49	2/8/2018	9:21				River / Cedarcrest	nd		
50	2/8/2018	9:25				Angel Haven	nd		
51	2/8/2018					133rd/Ute	nd		
52	2/8/2018	9:27	10:56 PM	45.38895	-122.8166	135th /Ute	nd		
53	2/8/2018	9:29				Cipole	nd		
54	2/8/2018	9:36		45.38053	-122.8065	19150SW 125th Ct.	7		
55	2/8/2018	9:37	11:03 PM	45.38053	-122.8065	19150SW 125th Ct.	4		
56	2/8/2018	9:38	11:08 PM	45.38166	-122.80685	19100 SW 125th Ct.	nd	swamp	
57			11:11 PM	45.38171	-122.80888	19005 SW 125th CT	<2	Bark smell and compost odor identifiable	
58	2/8/2018	9:50	11:20 PM	45.3055	-122.80696	19225-SW 125th Ct	<2	bark odor - wind from SW	Burrito Truck/Optimus Prime away from Grimms
59	2/8/2018	10:04				SW 119th ave			
60	2/8/2018	10:06	11:36 PM	45.37649	-122.80022	Marine Lumber, 11800 SW Myslony St		source of Strong Bark odor	
61	2/8/2018	10:10	11:38 PM	45.38186	-122.80082			wind shifted to N	
62	2/8/2018	10:16		45.38811	-122.808287	112th Leventon	<2 variable		Back at gate
63	2/8/2018	10:41				Pacific	7		Pete- spoke with at wet well. 1x/mo opens to look for potential odors. Vents at sewer main . CJ
64	2/8/2018		12:29 AM	45.38475	-122.81904	Sewer pump station			Baxter / Clean Water Services-503-Langer Park.
65	2/8/2018	11:15	12:48 AM	45.37268	-122.83414	Sherwood Home Depot	nd		

GPS Coordinates

#	Date	Time PST	IST on iPhone	Easting	Northing	Location Description	DT	Odor description	Comments
66	2/8/2018	11:34	1:04 AM	45.39259	-122.81543	Culdesac - end of SW Bedford. To trail.	7	Grimms	King City Community Park. Note DTs not consistent. Either too
67	2/8/2018	11:37		45.39259	-122.81543	Culdesac - end of SW Bedford. To trail.	<2	Grimms	
68	2/8/2018	11:41		45.39259	-122.81543	Culdesac - end of SW Bedford. To trail.	0	Grimms	
69	2/8/2018	11:43		45.39259	-122.81543	Culdesac - end of SW Bedford. To trail.	<2		
70	2/8/2018	12:14		45.39299	-122.81127	13053 SW Bedford St	7	Slight Grimms odor Garbage like smell with hints of	
71	2/8/2018	12:17		45.39304	-122.80915	12867 SW Bedford St	2	Grimms	
72	2/8/2018	12:18		45.39214	-122.81191	17597 SW 131st Ave	7	Grimms	
73	2/8/2018	12:21		45.39214	-122.81191	17598 SW 131st Ave	7	Grimms	
74	2/8/2018	12:23		45.39214	-122.81191	17599 SW 131st Ave	15	Grimms	

GMT Emissions					iPhone			Nasal		OLD PGM 2000-E			NEW PGM 6228					ReoTemp			
ID	Evaluation	Grimm's Fuel			compass	Testo 416	Ranger											Extec	2' Bi-metal		
ID#	Date	Time	Location	Test Method	Stack Flow fpm	Surface Flow fpm	Wind direction	Wind fpm	D/T Ratio	O2%	CO ppm	H2S ppm	LEL %	O2%	NH3 ppm	LEL%	VOC ppm	SO2 ppm	Stack Temp °F	Pile Temp °F	NOTES
1	1/31/2018	4:07	PILE 1 top	PROBE	-	-	-	-	15	-	15	0	-	0.7	-	24	1.8*,**	-	-	80	pre pile disturbance
2	1/31/2018	4:26	PILE 1 top	TUB	165	1.11	-	-	≥60	-	32	0	-	16.6	-	>99	7.5*	-	-	124	pre pile disturbance
3	1/31/2018	4:36	PILE 1 top	TUB	0	0.00	-	-	30	-	5	0	-	19.9	-	22	5.3*	-	-	120	pre pile disturbance
4	1/31/2018	4:41	PILE 1 top EDGE	TUB	0	0.00	-	-	30	-	5	0	-	18.2	-	88	3.9*	-	-	124	pre pile disturbance
5	1/31/2018	4:46	PILE 1 top EDGE	PROBE	-	-	-	-	-	-	48	0	-	9.5	-	>99	1.2*,**	-	-	130	pre pile disturbance
6	1/31/2018	4:51	PILE 1 side	TUB	-	-	-	-	30	-	3	0	-	20.9	-	0	3.5*	-	-	113	pre pile disturbance
7	1/31/2018	4:55	PILE 1 side	PROBE	-	-	-	-	-	-	21	0	-	0	-	≥99	1.5*,**	-	-	118	pre pile disturbance
8	1/31/2018	5:06	PILE 2 top	TUB	130	0.87	-	-	30	-	32	0	-	18.3	-	>99	4.7*	-	-	142	pre pile disturbance
9	1/31/2018	5:16	PILE 2 top	PROBE	-	-	-	-	-	-	12	0	-	9.9	-	73	2.1*,**	-	-	142	pre pile disturbance
10	1/31/2018	5:21	PILE 2 top	TUB	150	1.01	-	-	≥60	-	6	0	-	16.9	-	>99	5.8*	-	-	122	pre pile disturbance
11	1/31/2018	5:24	PILE 2 top	PROBE	-	-	-	-	-	-	103	0	-	0	-	nr	2.1*,**	-	-	122	pre pile disturbance
12	1/31/2018	5:29	PILE 2 top	TUB	125	0.84	-	-	30	-	7	0	-	19.6	-	>99	6.7*	-	-	124	pre pile disturbance
13	1/31/2018	5:32	PILE 2 top	PROBE	-	-	-	-	-	-	13	0	-	2.8	-	>99	1.8*,**	-	-	124	pre pile disturbance
1	2/7/2018	13:50	PILE1 SE 20' deep	TUB	120	0.81	-	-	≥60	-	-	-	-	20.1	0	12	8.5*	0.3	89	157	day 3 of pileturning
2	2/7/2018	13:55	PILE1 SE 20' deep	PROBE	-	-	-	-	-	13.1	95	0	>100	0.4	0	>99	0*,**	0.3	-	-	odor: burnt bark, pungent, compost, sl. Tobacco
3	2/7/2018	14:05	PILE1 20' N aisle	TUB	140	0.94	-	-	≥60	19.4	87	0	13	18.3	0	>100	0.8*	0.1	113	110	day 3 of pileturning
4	2/7/2018	16:20	PILE1 20' N aisle	PROBE	-	-	-	-	-	1.7	22	0	>100	4.1	0	>100	0*,**	0.1	-	-	day 3 of pileturning
5	2/7/2018	14:20	PILE 4 NW	TUB	0	0.00	-	-	≥60	18.9	74	0	14	18.5	0	15	1.2*	0.2	80	104	day 3 of pileturning
6	2/7/2018	14:24	PILE 4 NW	PROBE	-	-	-	-	-	-	-	-	-	12.5	0	93	0.9*,**	0.3		148@6"	148F@6"
7	2/7/2018	14:30	PILE 4 NE	TUB	0	0.00	-	-	≥60	18.1	91	0	11	20.2	0	3	1.7*	0.2	77	102	strong, sweet, fruity odor
8	2/7/2018	14:35	PILE 4 NE	PROBE	-	-	-	-	-	20	27	0	5	20.9	0	0	1.4*,**	0.4	-	-	day 3 of pileturning
9	2/7/2018	14:40	PILE3 NE - FRESH	TUB	120	0.81	-	-	≥60	18	248	0	5	17	0	4.5	38.7*	9.1	-	72	day 3 of pileturning
10	2/7/2018	14:45	PILE3 NE - FRESH	PROBE	-	-	-	-	-	4.5	>1000	0	22	3.4	0	21	6*,**	0.7	-	107	day 3 of pileturning
11	2/7/2018	15:02	PILE3 NE - TOP	TUB	0	0.00	-	-	≥60	17.3	21	0	100	19.6	0	33	22.5*	13.4	-	123	day 3 of pileturning
12	2/7/2018	15:08	PILE3 NE - TOP	PROBE	-	-	-	-	-	0.4	76	0	100	0.2	0	>99	0*,**	11.2	76.6	-	day 3 of pileturning
13	2/7/2018	15:15	PILE2 TOP - E EDGE VENT	TUB	-	-	-	-	≥60	12.8	18	0	>100	9.6	0	63	2.5*	20	146	138	day 3 of pileturning
14	2/7/2018	15:15	PILE2 TOP - E EDGE VENT	PROBE	-	-	-	-	-	2.2	500	0	100	0.2	0	>99	0*,**	3.7	72.8	144	day 3 of pileturning
1	2/8/2018	13:07	FINISH PILE - TOP VENT	TUB	160	1.07	NE	500	Non-detect	18.5	0	0	38	18.9	0	34	6.1*	0.1	-	125	finished pile day 4 of pileturning
2	2/8/2018	13:16	FINISH PILE - TOP VENT	PROBE	-	-	-	-	-	7.1	0	0	>100	5.9	0	>99	0*,**	0.1	-	-	finished pile day 4 of pileturning
3	2/8/2018	13:22	FINISH PILE-TOP NO VENT	TUB	150	1.01	0	calm	Non-detect	20.4	0	0	7	20.5	0	6	0*	0	-	118	finished pile day 4 of pileturning
4	2/8/2018	13:22	FINISH PILE-TOP NO VENT	PROBE	-	-	-	-	-	0.8	16	0	>100	0	0	>99	0*,**	0.2	-	-	finished pile day 4 of pileturning
5	2/8/2018	13:48	FINISH PILE - BENCH- NO VENT	TUB	130	0.87	-	-	Non-detect	10	0	0	5	20.7	0	3	0*	0	-	83	finished pile day 4 of pileturning
6	2/8/2018	13:48	FINISH PILE - BENCH- NO VENT	PROBE	-	-	NE	300	-	0.9	4	0	>100	0	0	>99	0*,**	0.1	-	-	finished pile day 4 of pileturning
7	2/8/2018	13:55	FINISH PILE -E LOW BENCH	TUB	123	0.83	NE	50	Non-detect	20.2	0	0	2	20.9	0	0	0*	0	-	93	finished pile day 4 of pileturning

* potentially impacted by desiccant

** impacted by methane interference

GMT Emissions ID	Evaluation	Grimm's Fuel						iPhone compass	Testo 416	Nasal Ranger	OLD PGM 2000-E			NEW PGM 6228					Extec	ReoTemp 2' Bi-metal	NOTES
ID#	Date	Time	Location	Test Method	Stack Flow fpm	Surface Flow fpm	Wind direction	Wind fpm	D/T Ratio	O2%	CO ppm	H2S ppm	LEL %	O2%	NH3 ppm	LEL%	VOC ppm	SO2 ppm	Stack Temp °F	Pile Temp °F	
8	2/8/2018	13:55	FINISH PILE -E LOW BENCH	PROBE	-	-	-	-	-	1.2	6	0	>100	0	0	99	0*,**	0.1	-	-	finished pile day 4 of pileturning
1	2/21/2018	11:03	PUSH RAMP PILE 1 15' HIGH	TUB	180	1.21	NE	1-5 MPH	45	20.9	0	0	4	20.3	0	4	0.4	0.1	46.7	-	
2	2/21/2018	11:03	PUSH RAMP PILE 1 15' HIGH	PROBE	-	-	-	1-5 MPH	-	1.3	51	0	100+	0	0	99+	2.4**	1.3	-	115	
3	2/21/2018	11:22	PUSH RAMP PILE 1 40' HIGH EDGE	TUB	240	1.61	NE	1-5 MPH	45	17.5	90	0	43	17.1	0	74	27.3**	2.7	65	-	
4	2/21/2018	11:22	PUSH RAMP PILE 1 40' HIGH EDGE	PROBE	-	-	-	1-5 MPH	-	10.7	188	0	100+	8.8	0	99+	17.9**	7.8	-	128	
5	2/21/2018	11:45	PUSH RAMP PILE 1 45' HIGH CENTER	TUB	140	0.94	NE	1-5 MPH	45	20.3	3	0	0	20.9	0	4	21.4	2.1	57	-	
6	2/21/2018	11:45	PUSH RAMP PILE 1 45' HIGH CENTER	PROBE	-	-	-	1-5 MPH	-	0.2	85	1.7	100+	0	0	99+	8.4**	6.3	-	110	
7	2/21/2018	2:40	PILE 3 HIGH CENTER NO CHIPS	PROBE	-	-	-	1-5 MPH	-	1.6	147	0	100+	1.3	0	99+	4.3**	4.6	54.7	-	
8	2/21/2018	2:40	PILE 3 HIGH CENTER NO CHIPS	TUB	180	1.21	NE	1-5 MPH	45	20.2	0	0	4	20.9	1	5	60.9	2.8	-	110	
9	2/21/2018	3:00	PILE 3 HIGH CENTER CHIP COVER	PROBE	-	-	-	1-5 MPH	-	1.1	59	0	100+	0.8	0	99+	3.4**	3	-	108	
10	2/21/2018	3:00	PILE 3 HIGH CENTER CHIP COVER	TUB	240	1.61	NE	1-5 MPH	45	20.2	7	0	15	20.9	1	4	58.8	1.4	50.8	-	
11	2/21/2018	3:18	PILE 3 NW EDGE ON CHIPS	PROBE	-	-	-	1-5 MPH	-	10	43	0	100+	0.9	0	99+	4.8**	2.6	-	125	
12	2/21/2018	3:18	PILE 3 NW EDGE ON CHIPS	TUB	280	1.88	NE	1-5 MPH	45	18	6	0	43	19.5	0	25	45**	3	57	-	VOC's jump very high when removed from probe to cover
13	2/21/2018	3:35	PILE 3 NE CORNER ON CHIPS 10" DEEP	PROBE	-	-	-	0-3 mph	-	2.2	24	0	100+	1	0	99+	4.2,**	3	-	120	
14	2/21/2018	3:35	PILE 3 NE CORNER ON CHIPS 10" DEEP	TUB	240	1.61	NW	0-3 mph	45	14.5	36	0	100+	14.4	0	99+	2.8**	4.5	83.4	-	
15	2/21/2018	4:00	PILE 2 EAST EDGE ON CHIPS 4"	PROBE	-	-	NW	0-3 mph	-	20.9	0	0	4	20.9	1	3	10.7	1.3	38	-	
16	2/21/2018	4:08	PILE 2 EAST EDGE ON CHIPS 4"	PROBE	-	-	-	0-3 mph	-	1.1	24	0	100+	0.9	0	99+	6.2**	3.2	-	135	
17	2/21/2018	4:12	PILE 2 EAST EDGE ON CHIPS 4"	TUB	220	1.48	NW	0-3 mph	45	11.7	24	0	100+	12.7	0	99+	3.7**	2.4	88	-	
18	2/21/2018	4:21	PILE 2 CENTER ON CHIP 12"	PROBE	-	-	-	CALM	-	2.2	22	0	100+	0.9	0	99+	3.8**	2.3	-	110	

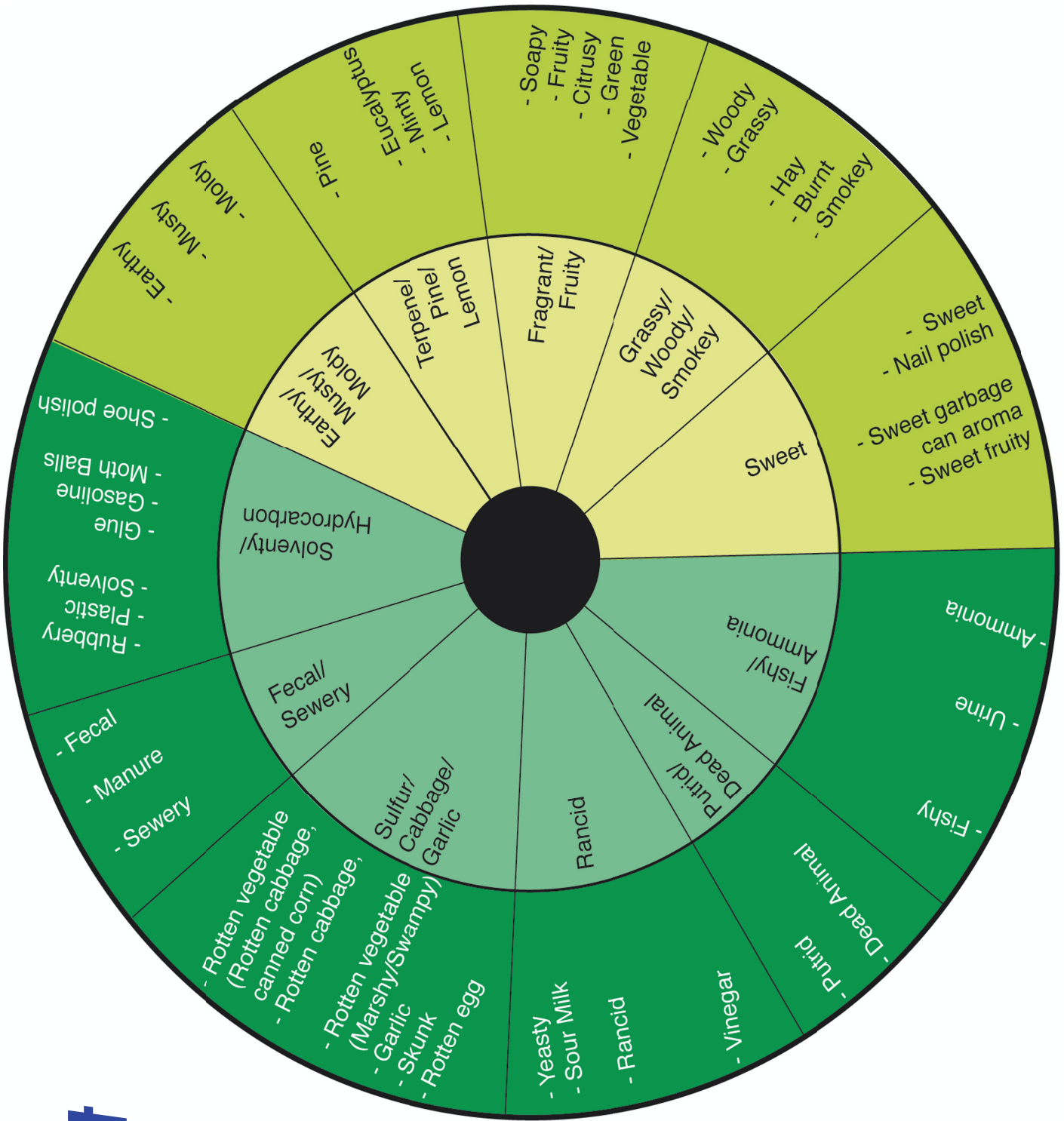
* potentially impacted by desiccant

** impacted by methane interference

GMT Emissions																						
ID	Evaluation	Grimm's Fuel				iPhone compass	Testo 416	Nasal Ranger	OLD PGM 2000-E					NEW PGM 6228					Extec	ReoTemp 2' Bi-metal		
ID#	Date	Time	Location	Test Method	Stack Flow fpm	Surface Flow fpm	Wind direction	Wind fpm	D/T Ratio	O2%	CO ppm	H2S ppm	LEL %	O2%	NH3 ppm	LEL%	VOC ppm	SO2 ppm	Stack Temp °F	Pile Temp °F	NOTES	
19	2/21/2018	4:28	PILE 2 CENTER ON CHIP 12"	TUB	0	0.00	W	0-3 MPH	45	20.2	5	0	4	20.6	1	8	30.3	1.8	51	-		
20	2/21/2018	4:39	PILE 2 CENTER NO CHIP	PROBE	-	-	-	0-3 MPH	-	1.5	32	0	100+	1.7	0	99+	3.6**	2.6	-	85		
21	2/21/2018	4:47	PILE 2 CENTER NO CHIP	TUB	0	0.00	W	0-3 MPH	45	20.3	4	0	7	20.9	1	11	43	1.3	44	-		
						0.83	Average surface flow fpm															
				inch	inch	Area sq.ft.																
				TUB AREA COVERING PILE Exhaust Tube Exiting Tub	18	26	3.25															
				2 "	0.021816																	

* potentially impacted by desiccant
** impacted by methane interference

Compost Odor Wheel



Appendix E - Dispersion Modeling Report

- E-1 Air Sciences Inc. Technical Memorandum: Odor Dispersion Modeling Analysis
for the Grimm's Facility
- E-2 GreenHouse Gas Primer



TECHNICAL MEMORANDUM

ODOR DISPERSION MODELING ANALYSIS FOR THE GRIMM FACILITY

PREPARED FOR: Jeff Gage, Green Mountain Technologies

PREPARED BY: Kent Norville, Air Sciences Inc.

PROJECT NO.: 415-1

DATE: June 13, 2018

Grimm Fuel Company (Grimm's) in Tualatin Oregon is a retail landscape facility that accepts yard debris for composting. Grimm's is regulated by the Oregon Department of Environmental Quality (DEQ) and Metro. Metro regulates the management of yard debris and wood waste at the facility and regularly inspects the facility to verify compliance with the conditions of its Metro-issued license and Metro Code. Grimm's current license was initially set to expire on June 30, 2017 but Metro granted a six-month license extension to ensure that the public has an opportunity to provide input on the proposed license renewal. Metro contracted with Green Mountain Technologies Inc (GMT) to access the Grimm's facility, conduct research on the patterns of odor issues, and compile a report discussing the approaches for addressing the Grimm's operation. As part of the report, odor dispersion modeling was conducted, using odor measurements taken around the facility to evaluate conditions from the main compost pile for potential recipients up to 2 miles away. The odor modeling was then used to estimate reduction levels needed to reduce the odor potential around the facility. This technical report summarizes the findings from an odor dispersion modeling analysis for the Grimm's facility.

For Grimm's current composting configuration, the modeling and field measurements show that the Grimm facility has a significant odor impact to the surrounding community, in excess of 2 miles, especially under light wind conditions. The modeling indicates that considerable reduction of the pile "dilutions to threshold" (DT) value from over 1000 to down to 50 or less is needed to reduce the impacts to the nearby community.

Methodology

To support the dispersion modeling, GMT and its sub-consultants conducted odor sampling in the neighborhood around the Grimm's facility. This sampling occurred over three days, two of which active pile turning was occurring. The odor sampling measured the "dilutions to threshold" (DT) value, which is the number of volumes of clean (odor-free) air that would be necessary to dilute one volume of site air to the level at point that an average person could not identify the odor. Dispersion modeling provides a means to estimate the amount of dilution

that occurs as a plume of odor is transported downwind. Using the modeled derived dilution factors and the downwind observed DT values, a DT level at the downwind edge of the Grimm compost pile was then estimated. This pile DT provides an indication of the strength of the odor generated at the pile. This pile DT then can be used to estimate spatial extent of the potential impact to the nearby community and provide estimates of the amount of reduction in pile odor would be needed to substantially reduce the input to the nearby community.

Field Measurements

Odor sampling was conducted using The Nasal Ranger® Field Olfactometer. The Nasal Ranger is the “state-of-the-art” in field olfactometry for confidently measuring and quantifying odor strength in the ambient air. A Nasal Ranger creates a calibrated series of discrete dilutions by mixing the odorous ambient air with odor-free (carbon) filtered air. Field olfactometry defines each discrete dilution level as a “Dilution-to-Threshold,” DT ratio. DT is a measure of the number of dilutions needed to make the odorous ambient air “non-detectable”. The Nasal Ranger has 6 discrete dilution levels (2, 4, 7, 15, 30 and 60) as indicated in Figure 1. The larger DT means more dilutions are needed to make an odorous puff non-detectable. As an observer moves towards the odor source, the DT will increase. An odor DT of 2 is just noticeable, while a DT of 7 is considered a nuisance, and a DT of 30 or more is considered objectionable.

Figure 1. Nasal Ranger DT levels

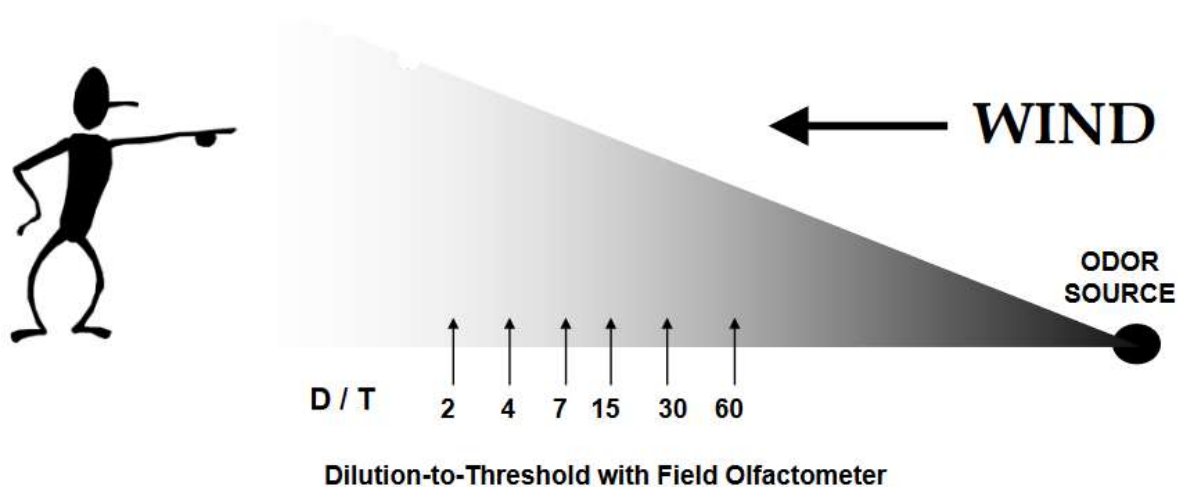


Table 1 shows the three days of field measurements. The locations, along with an indicator, is shown in Figure 2.

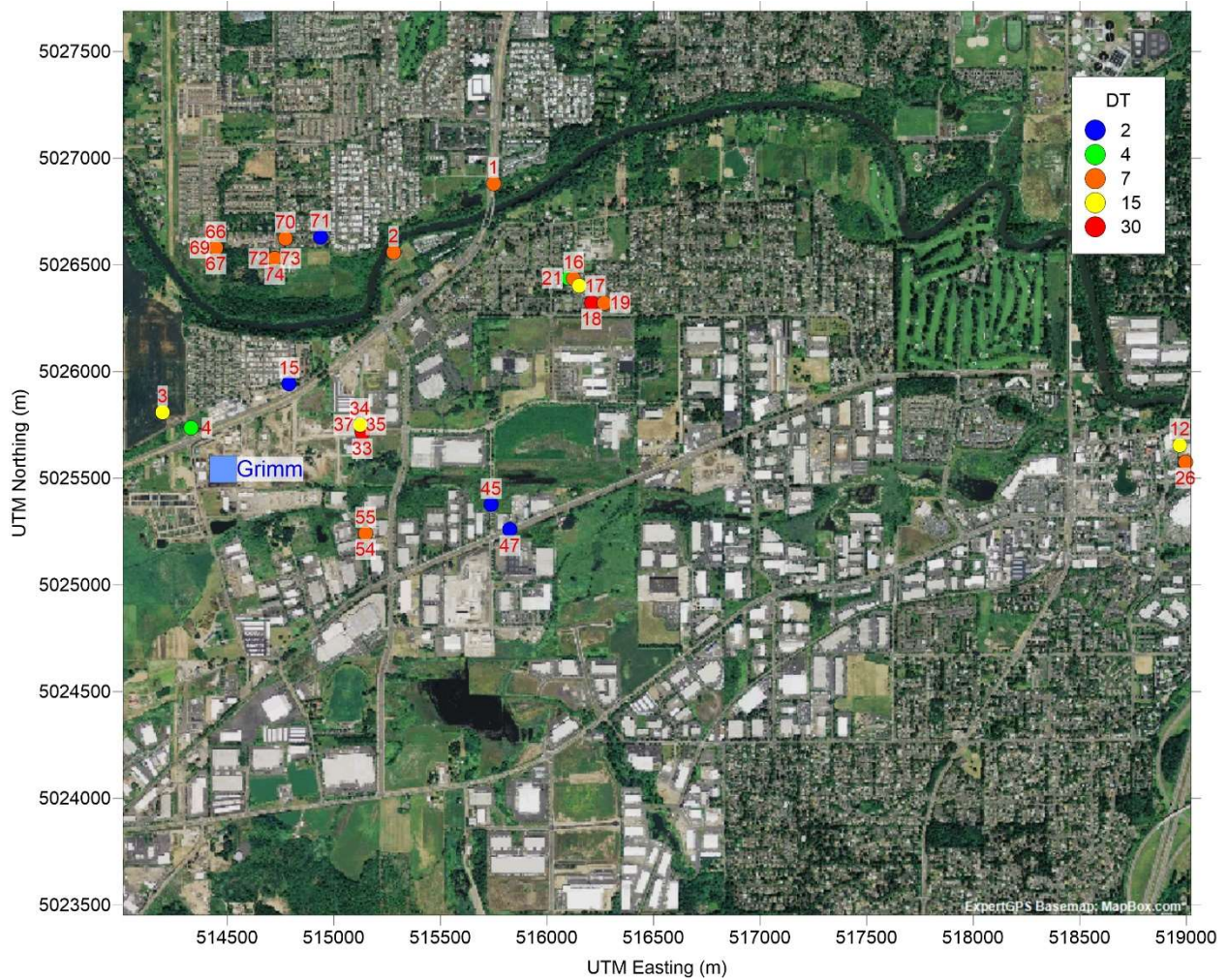
Table 1. Nasal Ranger Field Measurements

#	Date	Time PST	GPS Coordinates		Location Description	DT	Odor description or comment
			Easting	Northing			
1	1/31/2018	8:41	45.39528	-122.79878	River bridge	7	Woody Tobacco
2	1/31/2018	8:53	45.39239	-122.80478	Park river walk	7	Occasional Whiff of woody compost tobacco smell
3	1/31/2018	9:01	45.38567	-122.818654	SW Pacific Drive and Cipole	15	very strong odor of woody anaerobic high pinene, terpene with tobacco
4	1/31/2018	9:15	45.385	-122.81695	SW Pacific Drive and Cipole	4	Winds 250-330 fpm ESE
12	2/7/2018	10:54	45.38332	-122.757	Starbucks	15	molasses, sweet dirty socks w/green grass
15	2/7/2018	12:33	45.386847	-122.811062	Pacific Way @ /sw 130 th	2	detected while driving
16	2/7/2018	12:39	45.39127	-122.794	11430 Kalispell	7	sicky sweet, woody, bark
17	2/7/2018	12:45	45.390953	-122.793659	17825 SW 114 th	15	
18	2/7/2018	12:47	45.390222	-122.792925	113 th	30	silage, bitter, dirty sock undertones
19	2/7/2018	12:51	45.390233	-122.792165	11215 SW Apache	7	green grass / dirty socks
21	2/7/2018	13:03	45.391276	-122.794308	11430 Kalispell	4	dirty socks, grass
33	2/8/2018	8:10	45.38478	-122.80669	drive around to Eside of pile	30	
34	2/8/2018	8:18	45.38512	-122.80682		15	
35	2/8/2018	8:21	45.38512	-122.80682		15	
26	2/8/2018	7:00	45.38332	-122.757	Starbucks	2	Odor identifiable. Very different conditions from yesterday.
66	2/8/2018	11:34	45.39259	-122.81543	Culdesac - end of SW Bedford. To trail.	7	King City Community Park.
67	2/8/2018	11:37	45.39259	-122.81543	Culdesac - end of SW Bedford. To trail.	2	
69	2/8/2018	11:43	45.39259	-122.81543	Culdesac - end of SW Bedford. To trail.	2	
70	2/8/2018	12:14	45.39299	-122.81127	13053 SW Bedford St	7	Slight Grimms odor
71	2/8/2018	12:17	45.39304	-122.80915	12867 SW Bedford St	2	Garbage like smell with hints of Grimms
72	2/8/2018	12:18	45.39214	-122.81191	17597 SW 131st Ave	7	Grimms
73	2/8/2018	12:21	45.39214	-122.81191	17598 SW 131st Ave	7	Grimms
74	2/8/2018	12:23	45.39214	-122.81191	17599 SW 131st Ave	15	Grimms

ODOR DISPERSION MODELING ANALYSIS FOR THE GRIMM FACILITY

GPS Coordinates					DT	Odor description or comment
#	Date	Time PST	Easting	Northing		
37	2/8/2018	8:28	45.38512	-122.80682	7	
47	2/8/2018	9:12	45.380677	-122.797853	2	
45	2/8/2018	9:02	45.38173	-122.79897	2	slightly swampy/septic
54	2/8/2018	9:36	45.38053	-122.8065	7	
55	2/8/2018	9:37	45.38053	-122.8065	4	

Figure 2. Location and Intensity of Odor Field Measurements



On all three of these days of sampling, winds were calm (less than 1 mph), as indicated by the weather station at the Grimm's site and at the Hillsboro Airport. These calm wind conditions occur about 20 percent of the time. During such events, plumes from the pile can slowly meander downwind and not diffuse effectively, causing a significant odor impact. These conditions can lead to odor complaints well downwind of the facility. The average wind speed, as measured at Grimm's, was 1.5 m/s (~ 3.4 mph).

Dispersion Model

Atmospheric dispersion modeling is a technique for estimating odor concentrations that are caused by emissions from a source. While it is not possible to fully model the complexities of the atmosphere and the exact transport and dispersion of an odor, a series of mathematical models have been developed from empirical and theoretical studies to reliably estimate downwind concentrations.

For this analysis, U.S. EPA's AERSCREEN model was used. AERSCREEN is a single source dispersion model designed to provide a conservative estimate of downwind concentrations from the source, without the need for hourly meteorological data. It includes several source types (point, volume, area, circular area, and flare), will generate receptor arrays, incorporate downwash (if applicable), and setup the meteorological data. It can calculate a conservative 1-hour average concentration at receptors downwind of the source.

For this analysis, the pile was modeled as an elevated circular area source, which had a diameter of 40 meters (130 ft). It was assumed the average pile height was 43 feet (13.1 m). Because odor would loft off the top of the pile, the vertical dispersion coefficient of 2.3 meters (7.5 ft) was used to account for the lift. Figure 3 shows a schematic of the pile with the downwind receptors. Receptors were located at regular intervals downwind. The receptors were placed at nose level (6 ft). For the analysis, flat terrain was assumed. One receptor was also placed on the very top edge of the pile ($X = 40$ m, $Y = 13.1$ m) to determine the DT on the top of the pile.

For AERSCREEN, two wind speed conditions were considered: calm and average. To represent calm conditions, the lowest allowed wind speed was used (0.5 m/s). These calm conditions were prevalent (20 percent of the time). For average conditions, the annual average wind speed of 1.5 m/s was used. The air temperature was set to 40°F to match the actual conditions. Surface parameters (albedo, Bowen ratio, and surface roughness) were calculated using the EPA's AERSURFACE program based on average wetness conditions. The albedo was 0.18, the Bowen ratio was 0.83, and surface roughness was 0.1 m. The model was run using a unit emission rate of 1 g/s to get the receptor concentrations.

The dilution factors (DF) were found as a function of downwind distance by dividing the elevated pile edge concentration under calm conditions by the ground based downwind distance concentrations. An example of the downwind concentrations is shown in Figure 4. Then, for each of the field DT values, a pile edge DT value was found using:

$$\text{Pile_DT} = \text{Field_DT} * \text{DF}(x)$$

where x is the downwind distance.

Figure 3. Source Layout

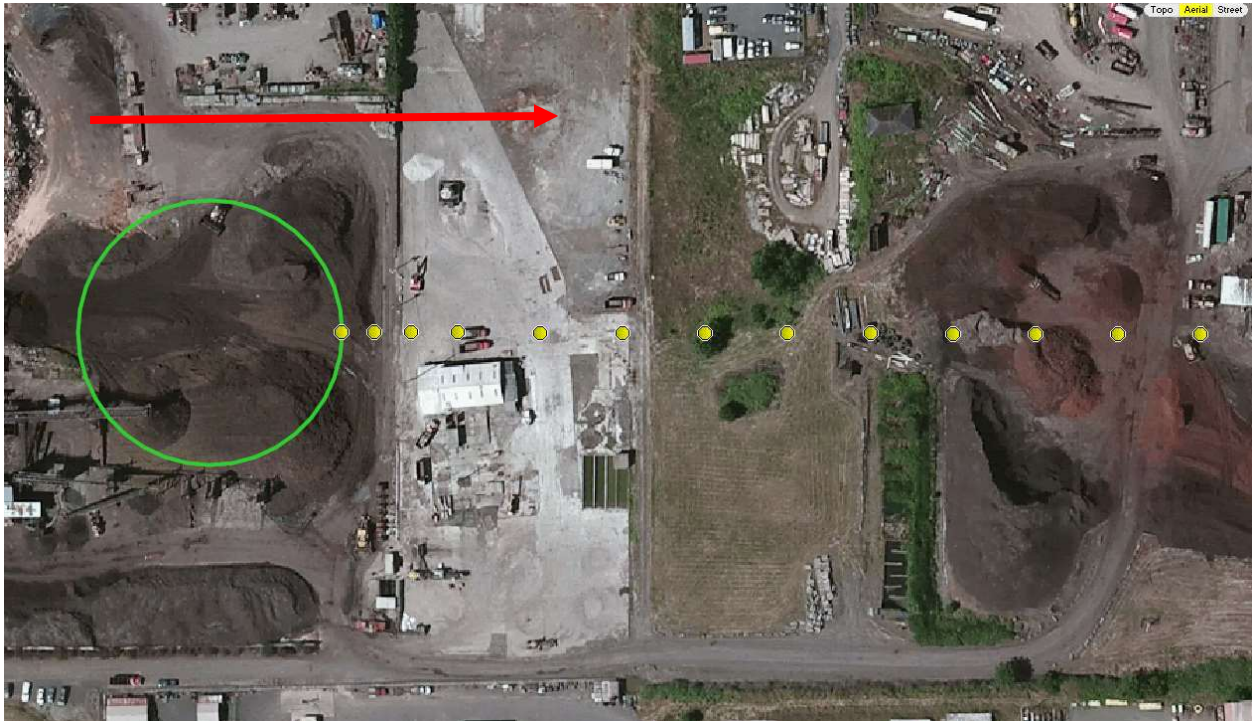
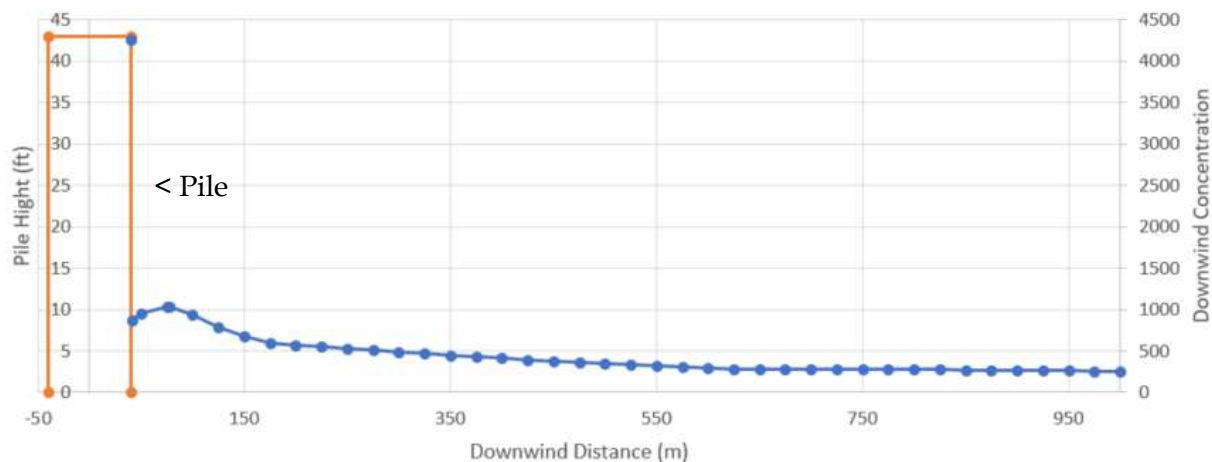


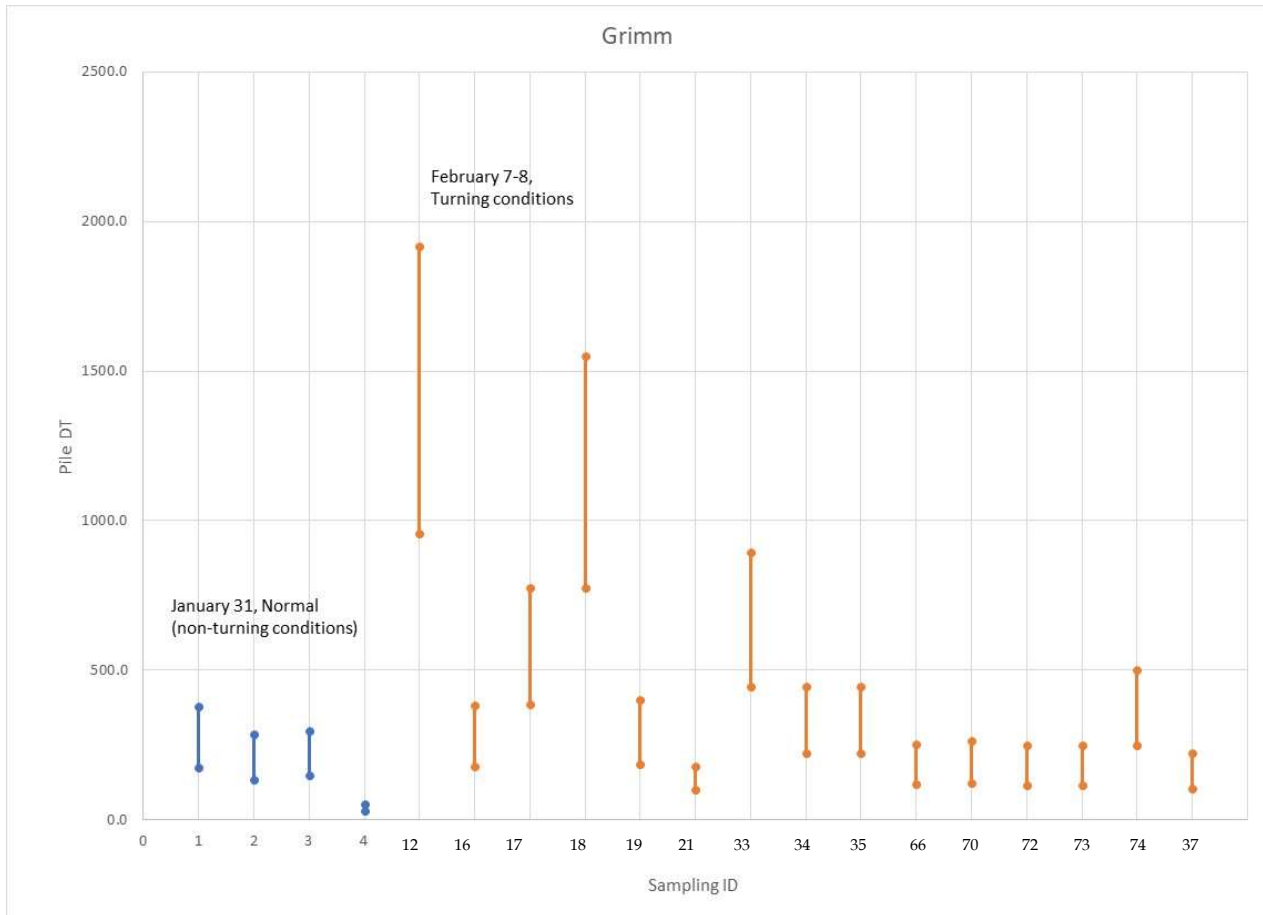
Figure 4. Downwind Concentrations

Results

For each field observation with an DT over 2, a pile DT was calculated. Figure 5 shows the pile DT for each field sample. Only calm conditions were used to derive the pile DT values. Since DT reading span a range of possible values (e.g., a DT of 7 could anywhere between 7 to 15), the range was shown to bracket the estimate. For January 31, pile DT values range from 19 to 400. Turning was not occurring on this day so it represents a “typical” winter day. Note that DT measurement taken on the pile during the late afternoon ranged from 30 to 60.

On February 7 and 8, active turning was occurring. Pile DT values were considerably higher, ranging from 62 to 1916 DT. Note that any single DT back-calculation is subject to considerable uncertainty as the exact plume location is highly variable under the calm wind conditions. The values on Feb 8 are likely too low as plume tracking was more difficult on that day. At best, the measurement will likely underestimate the pile DT.

For a “typical” day, the pile DT was assumed to be the mid-range of sample #1 (pile DT = 278). For a “turning” day, the pile DT was assumed to be the mid-range of sample #12 (pile DT = 1437).

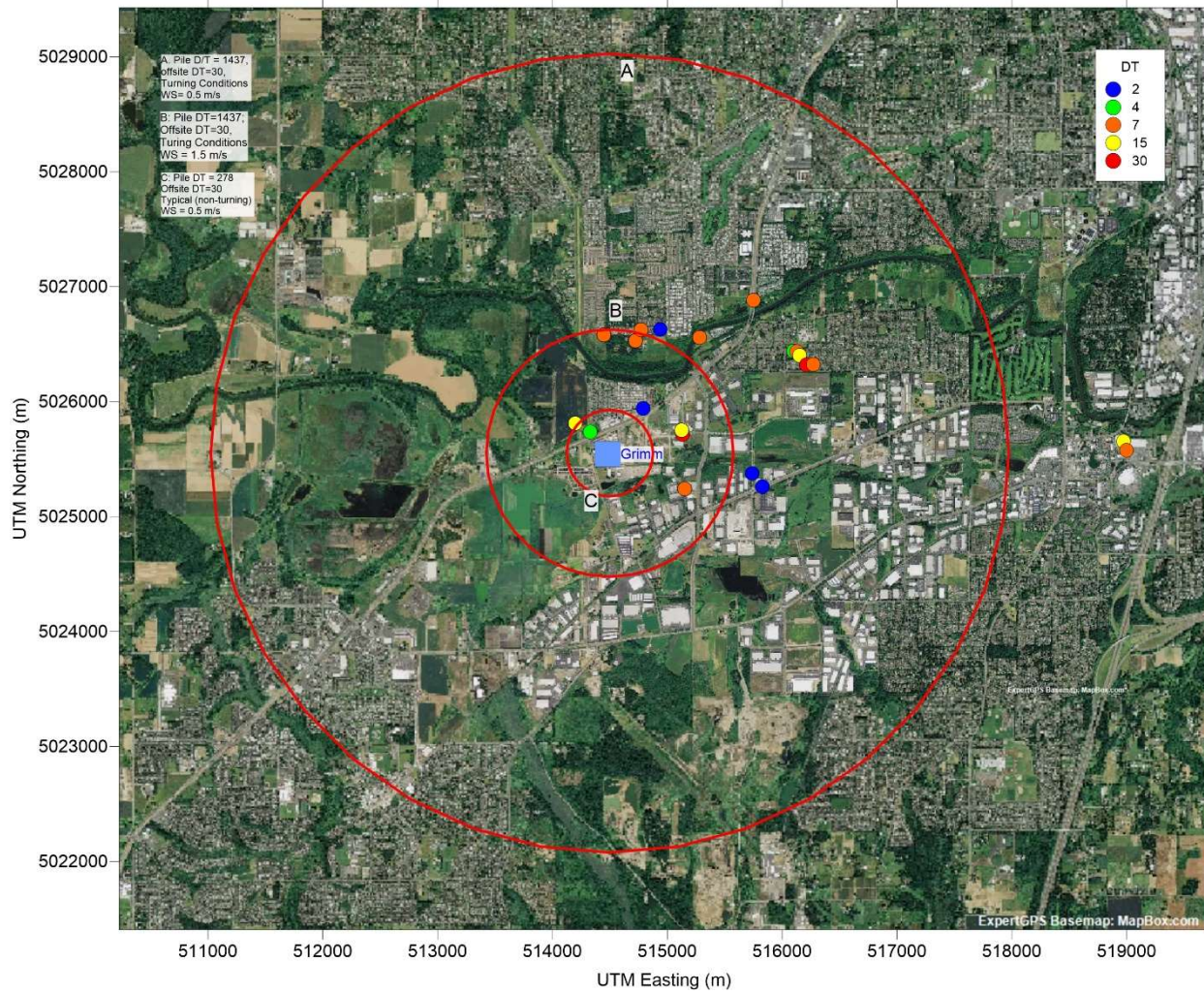
Figure 5. Pile DT for each field sample greater than 2 DT

Using these pile DT, an estimate of the area impacted by the facility is shown in Figure 6 for both calm and average wind conditions. Turning activities result in substantial impacts ($DT \geq 30$), extending out to almost 3.5 kilometers (2.2 miles) from the facility under calm conditions and out to 1.1 kilometers (0.68 miles) under average conditions.

For the “typical” conditions, substantial impacts ($DT \geq 30$), extending out to almost 375 meters (0.25 miles) from the facility under calm conditions. For average wind conditions, dispersion is sufficient to keep DT under 30. These results indicate that the Grimm operations, as currently configured, are having a significant impact in the nearby community.

The nearest residential location is approximately 300 meters from the center of the pile. At this distance, the dilution factors are about 8. Thus, to keep the offsite DT under 10, the pile DT would need to be reduced by roughly a factor of 18, to a DT of 80 or less.

Figure 6. Circles of Significant Impact (DT ≥ 30) under Turning and Typical Conditions





US Composting Council

USCC Factsheet

Greenhouse Gases and the Role of Composting: A Primer for Compost Producers¹

The biggest benefit of composting with respect to Global Climate Change comes from avoiding the production of methane.

Good composting practices minimize greenhouse gas emissions.

The use of compost provides numerous greenhouse gas benefits, both directly through carbon sequestration and indirectly through improved soil health, reduced soil loss, increased water infiltration and storage, and reduction in other inputs.

Anyone who as ever tended a compost pile, from a balcony worm bin to 1000 ton per day facility, is sure that what they are doing is GOOD FOR THE ENVIRONMENT. However, the increased focus on Global Warming and Climate Change is challenging this assumption and forcing composters to look to new answers to new questions. The goal of this factsheet is to provide composters with some basic definitions relating to Global Climate Change, help them understand composting's role, and offer some direction for additional resources.

What is Global Climate Change ?

Global Climate Change is the result of increased average temperature of the Earth's oceans and atmosphere, with profound consequences for humanity and the world as a whole. Some of these consequences include rising sea level endangering coastal populations, more extreme weather, and

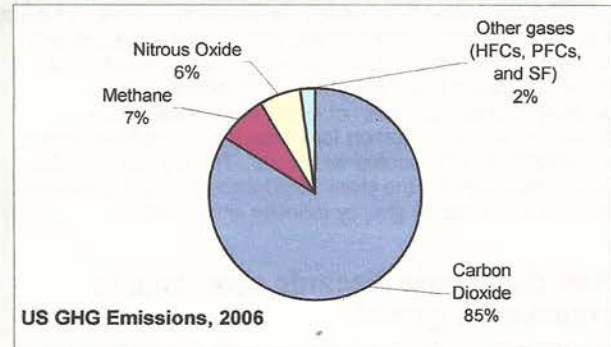
threats to agricultural production. Human health will be jeopardized by all of these changes."²

What is causing Global Climate Change?

The primary engine that drives the Earth's climate is the sun. A certain percentage of the solar energy that reaches our planet is trapped in the atmosphere by a process known as the "greenhouse effect," first described by Joseph Fourier back in 1829³. The primary gas responsible for this effect is carbon dioxide, CO₂⁴. While CO₂ levels in the atmosphere have changed over the course of Earth's history, it has become clear that human activities since the industrial revolution has caused a dramatic jump in the CO₂ levels, as we have developed a fossil-fuel based economy. That increase in CO₂ means that a greater fraction of the sun's energy is trapped rather than escaping each day, driving overall temperatures up.

What are greenhouse gases?

Greenhouse gases (GHG) are gases in the atmosphere that act to trap heat near the Earth's surface. While these gases and this effect are naturally occurring, human activities have caused an increase in the levels of these gases and thus an increase in their effect. Because of the lag time between emission and effect (up to 100 years) it is too late to completely prevent some climate change, but there is much that can be done to reduce emissions and thus reduce the rate and extent of the change, giving us more time to prepare and adapt to those changes.



Carbon dioxide (CO₂) is the main GHG. In 2005, the US released 6,090 Tg (Teragrams, or trillions of grams) of CO₂, which accounted for 85% of all US GHG emissions.⁵ The burning of fossil fuels for energy and transportation was responsible for 95% of the CO₂ emitted. Since other gases, such as methane (CH₄) and nitrous oxide (N₂O), are more effective at trapping heat than CO₂, the amounts and effects of

¹ Based on the article "Composting and Greenhouse Gas Emissions" by Sally Brown and Scott Subler, BioCycle, March, 2007, Vol. 48, No. 3, page 37-8.

² From "Climate Change 101: Understanding and Responding to Global Climate Change", published by the Pew Center on Global Climate Change, www.pewclimate.org.

³ Greenhouse effect. (2008, October 22). *New World Encyclopedia*.

⁴ Technically, water vapor has a bigger impact than CO₂, but since it is not anthropogenic (of human origin) it is not regulated or considered a GHG by the International Panel on Climate Change

⁵ Statistics on GHG emissions for the US are drawn from the USEPA website on climate change, <http://epa.gov/climatechange/index.html>

other gases are computed in terms of CO₂ equivalents (Table 1). In 2005, 539 Tg of CO₂ equivalents were released as CH₄, and 469 as N₂O.

Table 1. Global warming equivalencies of primary GHGs

Gas	Global Warming Potential (GWP) ^a	Atmospheric Lifetime
Carbon Dioxide	1	50-200
Methane	21	12±3
Nitrous Oxide	310	120

^aGWP of CH₄ and N₂O were changed to 23 and 296 respectively in the Third Assessment done by the IPCC. The equivalencies from the second assessment, shown above, are still used by the EPA so that updated inventories can be compared with former inventories and trends can be tracked.

How are greenhouse gases changing?

In order to tell if policies aimed at curbing Global Climate Change are having an effect, we need to have an inventory of GHGs. An inventory attempts to total and track the amount of GHGs that are released into the atmosphere each year and how much carbon is removed. Inventories can be done by countries, states, industries and even individuals. The United Nations Framework Convention on Climate Change (UNFCCC), of which the United States is a member, commits the country to performing an annual inventory of GHG sources and sinks. The Intergovernmental Panel on Climate Change (IPCC) provides the protocols by which the inventory is done. In doing the inventory, only anthropogenic (manmade) emissions are counted as "sources". Likewise, since carbon is naturally constantly being taken out of the atmosphere through photosynthesis, that does not count as removal. Only processes that store carbon for longer periods of time, called sequestration, are counted as "sinks". The US has provided GHG inventories for the years 1990 through 2007, reporting sources and sinks by gas, by industry and by sector.

How do organic discards contribute to greenhouse gases?

By definition, all organic discards contain carbon. When they decompose naturally under aerobic conditions the CO₂ they give off is part of the natural short-term carbon cycle⁶. Since this is part of the natural flux of CO₂ it is not considered in GHG computations. However, when those organic discards are placed in an anaerobic environment the decomposers will convert and release the carbon as methane and other volatile organic compounds which can contribute to global climate change. Organic discards that are high in nitrogen, such as food scraps, manures and grass clippings, under wet and oxygen-limited conditions, can also produce N₂O during decomposition, roughly 300 times worse than carbon dioxide.

⁶ Carbon is constantly removed from the atmosphere by plant photosynthesis, moved among organisms through the foodweb and released by via decomposition.

How does composting effect Global Climate Change?

To understand what effect composting has, we have to break the composting system into three components: the feedstocks, the composting process, and how the use compost product is used. Composting will have an impact based on what might have happened to the feedstocks if they were not composted, how the composting operation is run, and what happens to the compost. Positive impacts include emissions avoidance and carbon sequestration. Negative impacts result from emissions from the diesel powered processing equipment used to process feedstocks. The net effect is determined by adding up the benefits and detriments of each component.

Part 1: Feedstocks

If material that would otherwise end up producing methane or nitrous oxide is composted instead, this results in *avoided emissions*. Some common situations where this might apply include food wastes that are going to landfills and manures that get stored in uncovered lagoons. For example, every metric dry ton of food that goes to a landfill may generate .25 metric tons of methane in the first 120 days. Thus composting this food waste reduces emissions by the equivalent of up to 6 metric tons of CO₂. By the same token, if grass clippings that were going to a composter were redirected to a landfill, that would result in increased methane emissions at the landfill (up to about 2 tons of CO₂ equivalents for every ton of grass, depending on how the landfill is managed).

Transportation costs also have to be taken into account. If the composting facility is closer than the landfill (as is often the case, as landfills become more regional and take trash from further afield), then less energy will be used in transporting the waste, another benefit. On the other hand, if the food collection required more vehicle trips (or vehicle miles or use of less efficient vehicles) than would have been otherwise, then that would result in increased emissions, reducing the total avoidance. However, since methane is so much more damaging than CO₂, the vehicle "costs" are usually far outweighed by the benefits of methane reduction. For example, a long haul truck can carry about 30 wet tons of material. At 20% solids, that is 6 dry tons of food waste. For a 200 mile round trip the truck will emit 327 kg of CO₂. The total CO₂ equivalent of methane avoided by composting is 36 MG or 36,000 kg. That truck would have to drive back and forth from LA to New York City seven times to before the emissions outweighed the avoidance!

The US sent 25 million tons of food waste to landfills in 2005. The GHG impact of composting this mass would be the equivalent of removing 7.8 million passenger cars from the road.

Part 2: Composting Process

The EPA recognizes that well-run composters emit little methane and N₂O from the biological process of composting, so have little impact in GHG. Of course, the compost process uses diesel fuel to run grinders, turners, front-end loaders and the like. The burning of this fuel creates GHG emissions, as does electricity used to operate blowers, pumps, etc. If the

energy comes from bio-based fuels, like biodiesel or methane-fired generators, or other renewable energy sources, those emissions would be reduced from a GHG accounting perspective (because the carbon emitted is coming from the short term carbon cycle and replacing the carbon from fossil fuels, which is coming out of long term storage).

This is not to say the composting itself can't have GHG emissions. Both methane and nitrous oxide have been observed coming from compost piles (Hao, 2001, Sommer and Moller, 2000, Lopez-Real and Baptista, 1996). Methane forms under anaerobic conditions, often found at the bottom of piles. In the real world this probably happens frequently, but the methane is then oxidized as it reaches more aerobic portions of the pile and before leaving the pile. N₂O formation is less well understood, occurring closer to the surface where oxygen is limited but not absent and where nitrogen is in excess. The CO₂ released during composting is considered biogenic, not anthropogenic, so is not considered in greenhouse gas calculations. ***Good composting practices that balance the carbon:nitrogen ratio and provide adequate aeration and moisture will minimize GHG emissions.***

Part 3: Compost Use

Compost that is incorporated into the soil will continue to breakdown. Depending on the soil management practices, temperature, rainfall and feedstocks; a portion of that composted organic matter may become part of the soil's long term carbon pool (sequestration).

In addition, there are a number of indirect effects, such as, increased soil moisture holding capacity and a reduction in the need for fertilizers, herbicide or fungicide. This could result in less irrigation, which would mean less energy used and avoidance of associated GHGs. The same is true when compost use results in reduced fertilizer, herbicide or fungicide use.

In a detailed life cycle analysis of windrow composting in Australia, the emissions from the production of compost and composted mulch were more than outweighed by the benefits of the use of composted products. The emissions came from the use of fuel, water and electricity in compost production, transport and application. The benefits came from carbon sequestration and the reduction in fertilizers, electricity, water and herbicides (and thereby reducing the emissions associated with the production and use of these items). The net benefit persisted even if the composted products were transported over 400 miles to the application site and the trucks returned empty (Sharma and Campbell, 2003).⁷

Conclusion

The impact of composting on climate change is the sum of the three components of the compost system: the feedstocks, the process, and the end use.

- ④ The biggest benefit for most composting projects comes from emission avoidance; primarily from keeping methane-generating organics out of landfills or lagoons. Landfills with methane capture systems result in less GHG benefits.

(see USCC factsheet *Keep Organics Out of Landfills* for more details).

- ⑤ The composting process has the potential to produce some GHG, though those can be minimized. Good composting practices that balance the carbon:nitrogen ratio and provide adequate aeration and moisture will minimize GHG emissions.
- ⑥ The end use of the compost provides some GHG benefits, both directly through sequestration and indirectly through improved soil health, reduced soil loss, increased water infiltration and storage, and reduction of other inputs.

The actual benefits of a specific facility or system will have to be determined on a case-by-case basis. For more info on carbon credits for composters, see USCC factsheet *Composting and Carbon Credits*.

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⁷ The full report is available from the Recycled Organics Unit website, www.recycledorganics.com

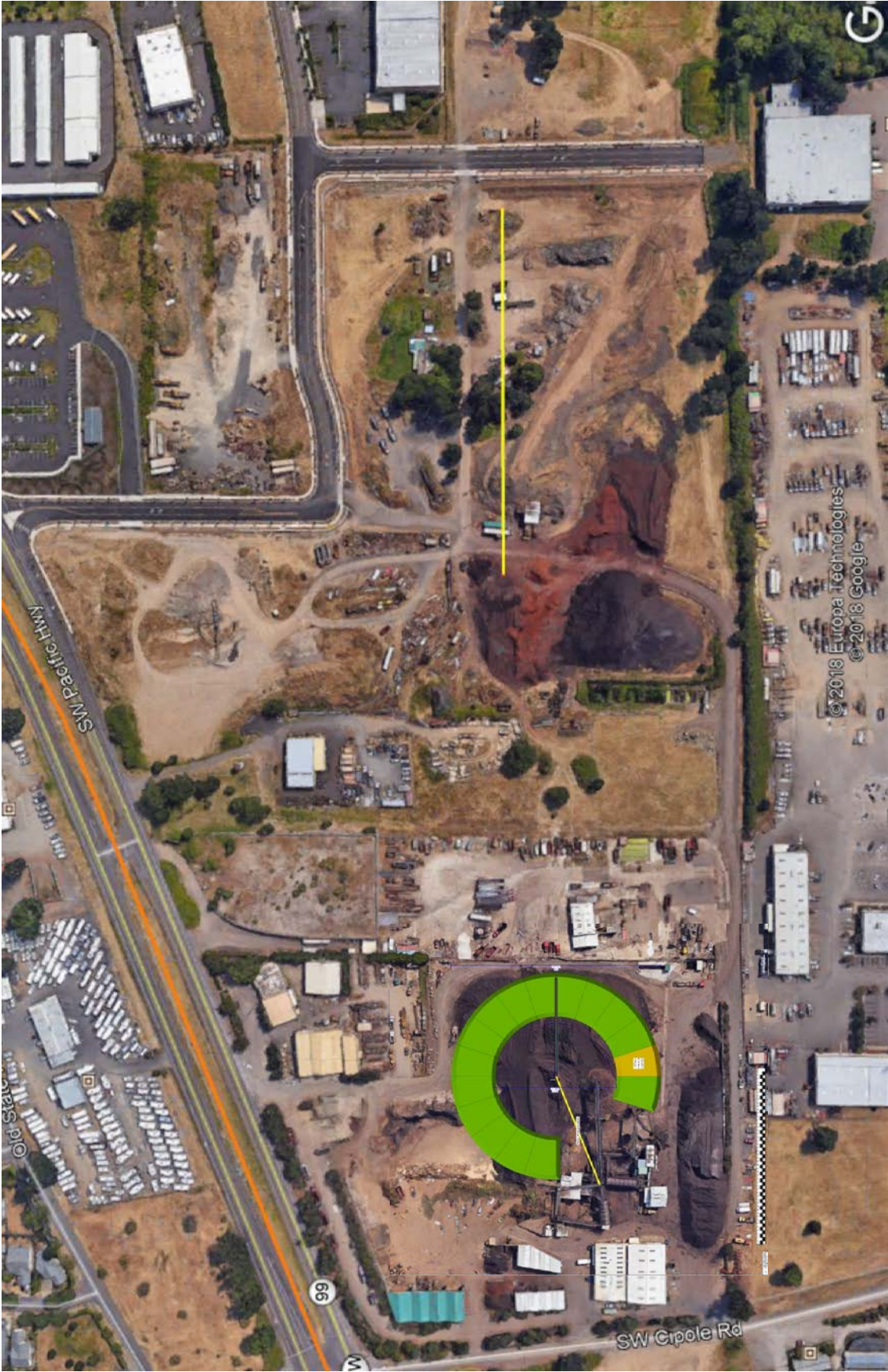
Appendix F - Alternative Development

- F-1 Alternative 1 Schematic
- F-2 Alternative 2 Schematic
- F-3 Alternative 3 Schematic
- F-4 Alternative 4 Schematic



1203 m3/zone
1,574 yd3/zone
16 zones
25,176 cubic yards in place
10,946 tons in place
40 days in place
273.66 tons per day
99,885 tons per year

Grimm's Fuel Compost Alternative 1
Aerated Bays with external Biofilter and Biocover Positive and Negative Aeration Bays
Max throughput ~100,000 tons per year



Grimm's Fuel Compost Alternative 2
Extended Aerated Static Piles with Biocover Positive Aeration Capability
Automated zone filling system with Radial Telescoping Conveyor
Max throughput ~104,000 tons per year

1253 m3/zone
1,639 yd3/zone at 12' deep
16 zones
26,223 cubic yards in place
11,401 tons in place
40 days in place
285.03 tons per day
104,036 Tons per year



Total Building	560	275	\$50.91	square foot costs
Inside Aerated floor	300	240	10	feet tall
Volume	26,667	cubic yards	21	days inside minimum
Compost in place	11,594	tons in place	1.5	peaking factor
Daily Production	368	TPD average	552	TPD peak
Avg. Inside Capacity	134,346	tons per year capacity	31.50	days avg. inside
Curing covered	180	180	12	feet tall
Curing Capacity	14400	cubic yards	26	days curing at peak volumes
Cost Estimate			39	days curing at average production
				\$14,000,000

Grimm's Fuel Compost Alternative 3
Fully Covered Aerated Static Pile in Structure with External Biofilter
Negative aeration on Building, Positive Aeration on Composting Piles
Compost Turners run every 6 to 8 days
Throughput ~134,000 tons per year



Grimm's Fuel Compost Alternative 4	
2 Phases shown 3 total possible on site	
One or Two Turns on Aeration Pad	
Flexible ASP Piles on Concrete Air Pad	
Biofilter for Suction, Biocovers for Pressure	
Turned after 20 days with loaders or turners	
Negative Aeration with Biofilters first 20 days	
Average Throughput - 120,000 Tons per year	
Average Daily Throughput 328 Tons Per Day	

225 Aeration Pad width each section	\$ 30.00 cost per sq.ft.
430 Aeration pad length incl. biofilter	2 Sections of aeration pad
96,750 sq.ft.	120,000 Tons/year avg capacity
2.22 acres / section	47 Days in place
\$ 5,805,000 2 concrete aeration pads & piping	\$6 cost per sq foot
62,200 sq.ft asphalt	350 Pile width
\$ 373,200 Asphalt	10.5 feet high
390 Pile length	491 tons per day peak capacity
53,083 YD ³ in place	2.3 cubic yards per ton shredded
23,080 tons in place	
179,236 tons per year peak capacity	