S&H Logging

Proposed Yard Debris Composting on the Stafford Road Site

Assessment of Impacts Due to Odors and Bio-Aerosols And Determination of Buffers

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Appendices

1. SCREEN3 Output

Summary

S&H Logging is proposing to develop a new site where a positively vented Aerated Static Pile (ASP) with BioFiltration Cap composting technology will be used. This composting technology has measured lower emissions than composting facilities placed inside enclosed structures. It is projected that the onsite maximum odor concentration will be equivalent to the odor concentration from a similar sized windrow site, 2,200 ft from the site source under average meteorological conditions. Therefore, the proposed site is equivalent to a windrow site that has a 2,200 ft buffer. Four Oregon windrow sites with buffers less than this were reviewed and found to have acceptable off-site odor impacts to their neighboring communities.

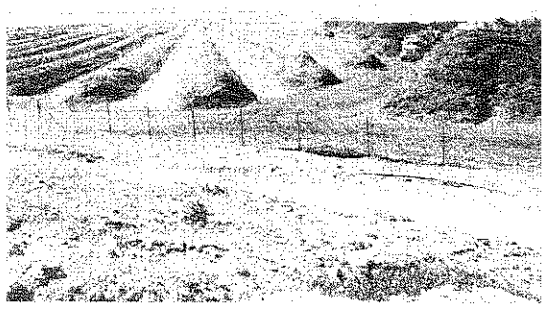
A similar reduction in bio-aerosol emissions is also anticipated. The low material handling requirements for the process will also contribute to low bio-aerosol emissions. The particulate nature of bio-aerosol emissions will allow for the easy monitoring and control of these emissions.

Proposed Composting Technology

Current Industry Practice

The current industry standard practice for composting green waste is to place the material in windrows that are periodically mixed, or "turned". The air required for the composting metabolism is supplied by natural convection through the pile. Turning also provides aeration , and the frequency is typically once per week. Photo 1 shows a typical windrow composting operation.

Photo 1. Typical Windrow Composting Operation.



Positive Aerated Static Pile with BioFilter Cap Technology

During the last couple of years a new composting technology has been developed and refined. This technology uses an aerated static pile (ASP) configuration. Aerated static piles have been used in the compost industry for the last 30 years. For this configuration, material to be composted is placed over an air plenum with the air necessary for composting metabolism supplied by a fan. The fan can either be blowing into the pile (positive ventilation), out of the pile (negative ventilation), or both. Historical aerated static piles have controlled emissions by either biofilters (for negative air systems) or tarps (positive air systems). The technology proposed in this application uses a positive air system with the emissions controlled using a biofilter cap instead of the more traditional tarp. Figure 1 shows a cut away view of this technology. This process achieves superior process and emissions control due to both the biofilter cover and the improved process control of the mechanical fan system.

Figure 1. Cut Away View of Positive ASP with BioFilter Cap.

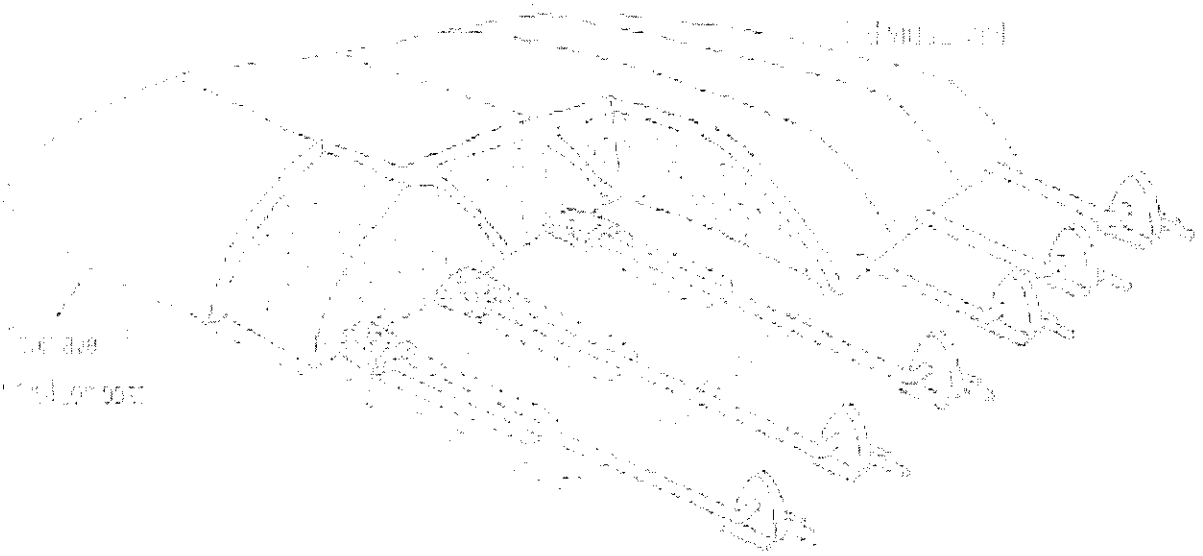
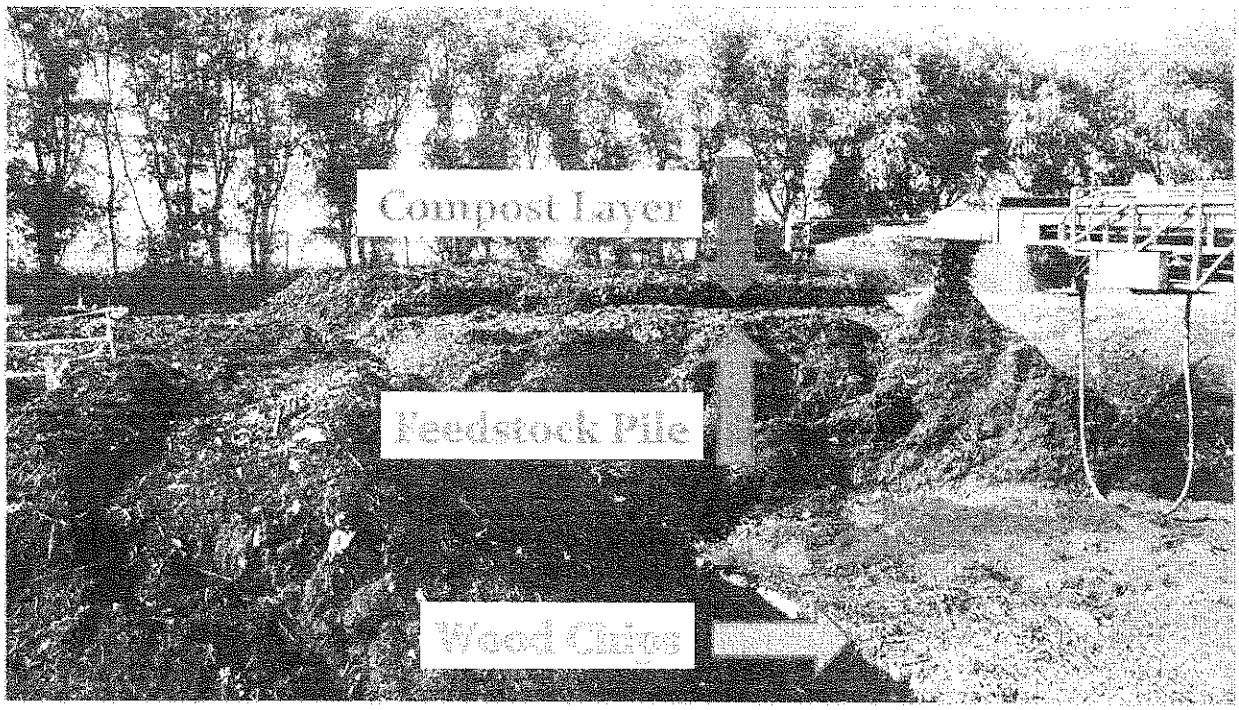


Photo 2 shows a pile using this technology under construction.

Photo 2 – Positive ASP with BioFilter Cap under Construction.



Air Emissions Control with this Technology

The San Joaquin Air Pollution Control District (SJVAPCD) sponsored a research project in 2012 to quantify the reduction in air emissions using this technology. The ASP with BioFilter Cap technology was tested against the industry standard windrow technology. Table 1 provides a summary of the data from that project. The final report should be available on the SJVAPCD web site by the end of this week.

Table 1. Summary of Air Emissions Control of ASP with Biofilter Cap as Compared to Industry Standard Windrows.

		NH3		Greenhouse Gas			
Cycle Length	VOC	Field	Lab	CO2	CH4	N2O	CO2e
22 Day	98.8%	83%	53%	72%	13%	89%	64%
30 Day	98.8%	91%	84%	74%	36%	83%	69%
60 Day	98.9%	94%	92%	72%	55%	70%	70%

No odor measurements were made, but the VOC control value has been found to be a good surrogate for odor emission for this technology. Odor measurements have been made on this technology and the findings have been similar to the VOC control efficiency shown above.

To put these numbers in perspective with other emission control technologies, Table 2 has been provided that shows the measured VOC control with all the major composting technologies.

Table 2. Measured VOC Control of Composting Technologies (as compared to Windrow).

Technology	VOC Control as Compared to Windrow
Negative ASP with Biofilter	80%
Positive ASP with MicroPore Membrane Cover	90%
Negative ASP with BioFilter (in Building)	Just less than 90%
Positive ASP with BioFilter Cap	99%

Table 2 shows that the emissions control provided by the Positive ASP with BioFilter Cap is substantially better than even an enclosed structure. The reason for this is the very large biofilter surface area. Since the biofilter cap covers the entire process, the size of the biofilter for the Positive ASP with BioFilter Cap is almost 10 times larger than the biofilters used for buildings.

Bio-Aerosol Emissions

In 2007 Dr. Harrison of Cornell University prepared a comprehensive literature survey of the Bio-aerosol issues at composting facilities. Most of the papers dealt with the industrial hygiene of compost workers. None of the compost processes discussed in any of the papers was as low emitting a process as the positive ASP with BioFilter Cap.

Bio-aerosols are very difficult to measure and there are no standardized or regulatory measurement methods. They are best measured and monitored using particulate matter (dust) as a surrogate. This is because they typically adhere to dust particles.

One of the reviewed papers (Wheeler et al, 2001) dealing specifically with buffer distances for Bio-aerosols recommended a buffer of 250 meters for windrow facilities. Some papers recommended

buffers as long as 500 meters In order to achieve no increase in background concentrations of bio-aerosols.

Most bio-aerosol material is associated with particulate (dust) emissions. Indeed, the most effective control for bio-aerosol is aggressive particulate management. The low instance of material handling operations associated with the Positive ASP with BioFilter Cap technology makes it an inherently low particulate emitter. In addition, dust emissions are visible and easily quantified by the appropriate regulators. They are not as ethereal as odor emissions.

The control efficiency of the biofilter cap on bio-aerosols has not been measured. However, the particulate reduction in the cap will be well over the 99% control that the cap provides for VOCs.

Most bio-aerosols behave in the atmosphere as particulate. However, the worse case dispersion will occur as if they were modeled as a gas. Using the EPA SCREEN3 model the equivalent gas concentration at a 500 m buffer for a windrow installation was compared against a positive ASP with BioFilter Cap. The SCREEN3 model showed that the concentration on the site for the ASP was lower than the gas concentration at 750 m (about 670 m from the edge of the process pad) from a comparable windrow site. The SCREEN3 output files are attached.

What can be concluded about bio-aerosols at the Borland Road site is as follows:

1. None of the literature reviewed in the Harrison study addressed sites as low emitting as the ASP with BioFilter Cap technology.
2. The concentration on site with the ASP technology will be lower than the concentration at 670 m (greater than the maximum recommended bio-aerosol buffer of 500 m) from a Windrow site assuming that the ASP VOC emission reduction is used as surrogate for bio-aerosols.
3. Bio-aerosols correlate well with dust emissions and dust emissions are the emissions that are most easy to observe, quantify, and regulate at composting sites.

Odor Emissions

In general, odor is the impact of most concern to the neighbors when a new compost site is being considered. The ASP technology using the BioFilter Cap has been shown to reduce odor emissions by a factor of 100 over the industry standard windrow technology.

If this site were a windrow composting site, the odor concentration at 750 meters (2,460 feet), for average meteorological conditions, would be the same as the maximum concentration on the site for an ASP site. In terms of buffer, this would be about 670 meters (2,200 ft) from the edge of the process pad.

Therefore the ASP site would have lower offsite odor than a comparable site with an acceptable odor level at less than 2,200 feet. For worst case meteorology, the distance is even farther. This is because odor migration is comparatively worse for the windrow under these conditions. Another way to look at this is that an ASP site using this technology is roughly equivalent to a windrow site with a 2,200 foot buffer.

Table 3 shows comparable windrow composting sites with the distances to the closest commercial and residential receptors. All of them have acceptable odor levels with residences less than 2,200 feet away.

From this analysis we can conclude that this site will outperform the sites in Table 3 in offsite odors and all the sites on Table 3 have an acceptable odor level.

Table 3. Comparable Windrow Compost Sites.

Site	Closest Residential Receptor (ft)	Closest Commercial Receptor (ft)
Lane Forest Products, 2111 Prairie Rd, Eugene	750	450
NW Greenlands, Riverside Road, McMinnville	400	100
Clackamas Compost Products 11436 SE Capps Rd	1,200	270
NW Greenlands Aumsville, 8712 Aumsville Highway SE	800	550

SCREEN3 Modeling

All atmospheric dispersion modeling used in this report was completed using the USEPA SCREEN3 software. The average meteorological condition was assumed to be Class C stability at a 2 m/s wind speed. Worse case meteorology was Class F at 1 m/s.

The active site was assumed to be 145m x 73m. The equivalent windrow site was assumed to be four times larger, 290m x 146m, due to the extra space requirements needed for windrow composting.

All model output is attached in the Appendix.

References

Harrison, E.Z. **Compost Facilities: Off-Site Air Emissions and Health.** Cornell Waste Management Institute, July 2007.

Appendix 1
SCREEN3 Output

05/14/13
10:25:08

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

ASP

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	1.00000
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	145.0000
LENGTH OF SMALLER SIDE (M)	=	73.0000
RECEPTOR HEIGHT (M)	=	1.5000
URBAN/RURAL OPTION	=	RURAL

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

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*** SCREEN AUTOMATED DISTANCES ***
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*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
100.	.4013E+08	6	1.0	1.0	10000.0	.00	26.
200.	.2854E+08	6	1.0	1.0	10000.0	.00	22.
300.	.2044E+08	6	1.0	1.0	10000.0	.00	17.
400.	.1596E+08	6	1.0	1.0	10000.0	.00	10.
500.	.1304E+08	6	1.0	1.0	10000.0	.00	1.
600.	.1083E+08	6	1.0	1.0	10000.0	.00	0.
700.	.9113E+07	6	1.0	1.0	10000.0	.00	0.
800.	.7814E+07	6	1.0	1.0	10000.0	.00	0.
900.	.6779E+07	6	1.0	1.0	10000.0	.00	0.
1000.	.5938E+07	6	1.0	1.0	10000.0	.00	0.
1100.	.5261E+07	6	1.0	1.0	10000.0	.00	0.
1200.	.4699E+07	6	1.0	1.0	10000.0	.00	0.
1300.	.4224E+07	6	1.0	1.0	10000.0	.00	0.
1400.	.3822E+07	6	1.0	1.0	10000.0	.00	0.
1500.	.3475E+07	6	1.0	1.0	10000.0	.00	0.
1600.	.3178E+07	6	1.0	1.0	10000.0	.00	0.
1700.	.2917E+07	6	1.0	1.0	10000.0	.00	0.
1800.	.2691E+07	6	1.0	1.0	10000.0	.00	0.
1900.	.2492E+07	6	1.0	1.0	10000.0	.00	0.
2000.	.2316E+07	6	1.0	1.0	10000.0	.00	0.
2100.	.2164E+07	6	1.0	1.0	10000.0	.00	0.
2200.	.2032E+07	6	1.0	1.0	10000.0	.00	0.
2300.	.1912E+07	6	1.0	1.0	10000.0	.00	0.
2400.	.1803E+07	6	1.0	1.0	10000.0	.00	0.
2500.	.1704E+07	6	1.0	1.0	10000.0	.00	0.
2600.	.1613E+07	6	1.0	1.0	10000.0	.00	0.
2700.	.1531E+07	6	1.0	1.0	10000.0	.00	0.
2800.	.1456E+07	6	1.0	1.0	10000.0	.00	0.
2900.	.1387E+07	6	1.0	1.0	10000.0	.00	0.
3000.	.1323E+07	6	1.0	1.0	10000.0	.00	0.
3500.	.1077E+07	6	1.0	1.0	10000.0	.00	0.
4000.	.9015E+06	6	1.0	1.0	10000.0	.00	0.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 100. M:

109.	.4066E+08	6	1.0	1.0	10000.0	.00	26.

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05/14/13

11:07:13

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

Windrow Average

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	AREA
EMISSION RATE (G/(S-M**2))	=	25.0000
SOURCE HEIGHT (M)	=	.0000
LENGTH OF LARGER SIDE (M)	=	290.0000
LENGTH OF SMALLER SIDE (M)	=	146.0000
RECEPTOR HEIGHT (M)	=	1.5000
URBAN/RURAL OPTION	=	RURAL

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** STABILITY CLASS 3 ONLY ***
*** ANEMOMETER HEIGHT WIND SPEED OF 2.00 M/S ONLY ***

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*** SCREEN AUTOMATED DISTANCES ***
****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
100.	.3464E+09	3	2.0	2.0	640.0	.00	6.
200.	.2734E+09	3	2.0	2.0	640.0	.00	24.
300.	.1490E+09	3	2.0	2.0	640.0	.00	16.
400.	.1030E+09	3	2.0	2.0	640.0	.00	0.
500.	.7570E+08	3	2.0	2.0	640.0	.00	0.
600.	.5765E+08	3	2.0	2.0	640.0	.00	1.
700.	.4522E+08	3	2.0	2.0	640.0	.00	0.
800.	.3638E+08	3	2.0	2.0	640.0	.00	0.
900.	.2989E+08	3	2.0	2.0	640.0	.00	0.
1000.	.2499E+08	3	2.0	2.0	640.0	.00	0.
1100.	.2123E+08	3	2.0	2.0	640.0	.00	0.
1200.	.1826E+08	3	2.0	2.0	640.0	.00	1.
1300.	.1588E+08	3	2.0	2.0	640.0	.00	0.
1400.	.1394E+08	3	2.0	2.0	640.0	.00	0.
1500.	.1235E+08	3	2.0	2.0	640.0	.00	0.
1600.	.1102E+08	3	2.0	2.0	640.0	.00	0.
1700.	.9893E+07	3	2.0	2.0	640.0	.00	0.
1800.	.8940E+07	3	2.0	2.0	640.0	.00	0.
1900.	.8121E+07	3	2.0	2.0	640.0	.00	0.
2000.	.7409E+07	3	2.0	2.0	640.0	.00	0.
2100.	.6788E+07	3	2.0	2.0	640.0	.00	1.
2200.	.6245E+07	3	2.0	2.0	640.0	.00	2.
2300.	.5767E+07	3	2.0	2.0	640.0	.00	2.
2400.	.5344E+07	3	2.0	2.0	640.0	.00	2.
2500.	.4967E+07	3	2.0	2.0	640.0	.00	2.
2600.	.4630E+07	3	2.0	2.0	640.0	.00	2.
2700.	.4326E+07	3	2.0	2.0	640.0	.00	2.
2800.	.4052E+07	3	2.0	2.0	640.0	.00	2.
2900.	.3803E+07	3	2.0	2.0	640.0	.00	2.
3000.	.3578E+07	3	2.0	2.0	640.0	.00	3.
3500.	.2711E+07	3	2.0	2.0	640.0	.00	3.
4000.	.2133E+07	3	2.0	2.0	640.0	.00	2.
4500.	.1724E+07	3	2.0	2.0	640.0	.00	2.
5000.	.1425E+07	3	2.0	2.0	640.0	.00	3.

Testimony to the Oregon House Land Use Committee

From: Will Gehr, S&H Logging Co., Inc., Tualatin, OR

Date: 5-15-2013

Introduction

We are the proposer of the compost facility on Stafford Road in the unincorporated area of Clackamas County that the "Dash 10" amendment to sb462 is meant to prevent. What follows is our testimony on this specific amendment to prevent composting within 1500' of schools. We appreciate the opportunity to present evidence as to the reasonableness of our proposal, and why the proposed amendment is unnecessary and misguided. I speak for myself as well as for the owners and the rest of the staff at S&H.

Why Our Proposal is Reasonable

I have listened to the testimony of the public hearing from 5-9-13, and will respond to the salient points. What comes across is the fear of the nearby residents as well as school parents and officials. They are fearful that school children and nearby residents will be physically or emotionally hurt from the migration of odor and/or bio-aerosols from our proposed composting. We respect our neighbors, residents and schools alike, and have applied ourselves rigorously to the challenge of creating a composting operation that is compatible with neighbors as well as any and all surrounding uses. We do not want to hurt anyone, and believe that this activity WILL NOT hurt anyone. The following explains how we expect to achieve this goal.

1) First, let me cite some context. We operate an existing commercial compost facility in the Clackamas Industrial Area some 11 miles away from our primary yard on Stafford Road. The Clackamas site is owned by the County, and they have decided not to extend our lease because they want to develop the site and the surrounded land to create more jobs and, in general, to put this land to its highest and best use. We have looked far and wide during the past 5 years for a new site that satisfies criteria such as: good business model, promotes sustainability, provides long-term security, etc. Ultimately, we have settled on a 25 acre parcel across from our flagship yard on Stafford Road, which satisfies at least 2 of the 3 main criteria. It does not meet the "long-term" criteria due to the likelihood that the entire Stafford/Borland area will be brought into the Metro UGB in a couple of years, annexed by a neighboring jurisdiction, and developed into another Kruse Way. This could happen within 10 years, or it could take 20 years. No one can predict. Our proposed composting is meant to be an interim activity until this ultimate redevelopment takes place.
2) Before we applied for any permits, I met with local groups, including the Community Planning Organization as well as the Stafford Hamlet, to let them know what we were planning to do. We had our pre-application conference with county Planning Staff on 2-14-11, and applied for our Conditional Use Permit in the summer of 2011 and it was issued that winter. We applied for our

Design Review Permit in the summer of 2012 and it was issued in November 2012. Both decisions were initially appealed to LUBA, but the first was rejected and the second was withdrawn. We are almost 2 years into this permitting process, and I have met probably half a dozen times with local groups. I have been told by these groups that they appreciate my attempts to keep them updated and to answer their questions. We have had some of these meetings at the Stafford Elementary School. School officials were never present at these meetings until after the Design Review permit was granted. Each of the CUP and Design Review Permits contained a long list of conditions which we must meet before we can operate the facility, including dust and odor control.

3) As further evidence of a long, multi-layered, and thorough permitting process, our next task is to obtain a DEQ Solid Waste Facility Permit, and a Metro license. The DEQ permitting process starts with a Screening Process, which established the level of potential risk associated with the proposed activity. The DEQ Screening application was submitted in May, 2012, and the DEQ's Evaluation was completed in January of 2013. DEQ staff concluded that due to the size of the proposed composting facility as well as the close proximity of neighbors, the facility posed a POTENTIAL environmental risk for odors and other emissions, as well as for surface water contamination. This level of risk requires us to submit an Operations Plan, in which we will show how our operation will avoid these POTENTIAL impacts. We have made 2 significant changes in our proposal to address these potential risks: first, we are downsizing the facility size, and second, we are modifying our stormwater management to prevent all releases to the nearby creek. The Odor and bio-aerosol concerns are being addressed with a composting method that has been tested and shown to reduce gaseous emissions almost 100% (98.9%) compared to standard open windrow composting. A consultant's report is attached to this testimony. This was prepared for DEQ to provide them with a methodology for assessing the risk for impacts from odors or bio-aerosols.

4) DEQ's approach to regulating solid waste facilities is decidedly performance-based rather than prescription-based. The dash-10 amendment is just the opposite and should be dismissed as over-reactive and misguided, both for its effect on its intended target (S&H) and in general. Prescriptive remedies do not allow for the constant evolution of technology and improvement of methods. The composing industry is fertile ground for overall process improvements and lessening of potential impacts. For example, the composting method (Aerated Static Pile with BioCover Cap) that we propose to use is relatively new and just now being evaluated by DEQ staff. I targeted this method even before I applied for the land use permit, and have always had confidence that it would prevent impacts at this site. Since then, as luck would have it, an exhaustive $400,000 study in S. CA has confirmed its supreme effectiveness. Essentially this method is the equivalent of adding a 2200' buffer around our facility. Almost all compost facilities in the state have neighbors closer than this, yet continue to use the standard open windrow technique. Many of these facilities have sterling records of few odor complaints, not to mention the lack of complaints of increased symptoms from bio-aerosols.

I would like to now turn my attention to why adding the Dash-10 amendment to sb462 is a bad idea.

1) The proposed amendment is ill-conceived. Its "One-Off" nature has made it illogical and inappropriate. Are residents living full-time in homes less than 1500' away from composting facilities any less in need of protection? How about day cares or retirement homes?
2) Is the House Land Use Committee capable of evaluating the science of bio-aerosol risk-assessment? In spite of the emotional testimony, I doubt that any of us have a grasp of this, and mis-interpretation is rampant. Scientists don't agree on the potential risk of bio-aerosol exposure, and even admit that some exposure is critical to the healthy development of children's immune system. Of course some people are sensitive to common bio-aerosol levels, and must be protected from over-exposure, such as working at a compost site. However, over the years there has been periodic concern about aspergillus or other bio-aerosol emissions from compost facilities, and each time the allegations that composting is dangerous have come to nothing. I have been told by my consultants that there is not a single documented example of composting facility bio-aerosols causing illness in the surrounding population. That said, of course I think there should be a performance standard related to all emissions, and that is exactly what DEQ is requiring. My point is that DEQ is better able to evaluate this than are legislators.
3) DEQ has a site-by-site approach to evaluating composting proposals. They are rightly concerned about the close proximity of our neighbors, and are holding our feet to the fire to prove that we can operate without creating unacceptable impacts. The permit is not a foregone conclusion. In spite of our good neighbor's fears and emotional pleas, it is inappropriate for this robust regulatory process to be pre-empted. I understand a local representative's interest in serving her constituency, but there is an inherent conflict of interest in this process, and it should not overly influence other's opinions. This is not good democracy, this is bad governing.
4) Another way in which this proposed amendment is ill-conceived is that it ignores the fact that many schools promote and engage in composting on-campus. Granted, these compost bins may be small, but turning the material by students exposes them to much higher levels of bio-aerosols than the level to which the local school kids around us would ever experience from our compost facility. Would all on-campus composting be banned by this amendment?
5) According to DEQ, there has been no notice of ill-effects or complaints of odors at the middle school in Deschutes County that has an open windrow compost facility within 1500' of it.
6) The odor nuisance created by the North Plains facility is caused by a completely different set of circumstances which will not be duplicated in the slightest by our facility. We are starting from the ground up, will not be processing food waste, and will be using a composting method that is heads and shoulders better. We have years of composting experience and know what management is necessary to mitigate dust and aerosols. A knee jerk reaction against all composting, and a one-size-fits-all prescription is not the appropriate way to respond to this.

In summary, S&H is still in the midst of an exhaustive permitting process, which is meant to adequately safeguard our neighbors. At both the County and now at the State level (DEQ), our specific location and proposal is evaluated with ample and emphatic local resident input. Our feet have been held to the fire every step of the way, and it is still not guaranteed that we will convince all regulatory agencies that this can be a good fit. We are doing our best to carry on our business and our valued service in a somewhat dysfunctional regulatory climate where the best locations are not available for this use. Ultimately, this is a land use issue that would be appropriately addressed by this committee. While we support sb462 (the base bill), the proposed dash-10 amendment is a misguided attempt to pre-empt the existing site-specific, regulatory review process. The DEQ is the appropriate agency to assess risk and to assure environmental and public health safety, and have in place rules to guarantee this.