Dirt Hugger®

ORGANIC COMPOST CO. - OR / WA

Dirt Hugger Permitting

1. Background and History
2. Permitting Experience
3. Take Aways & Reflections

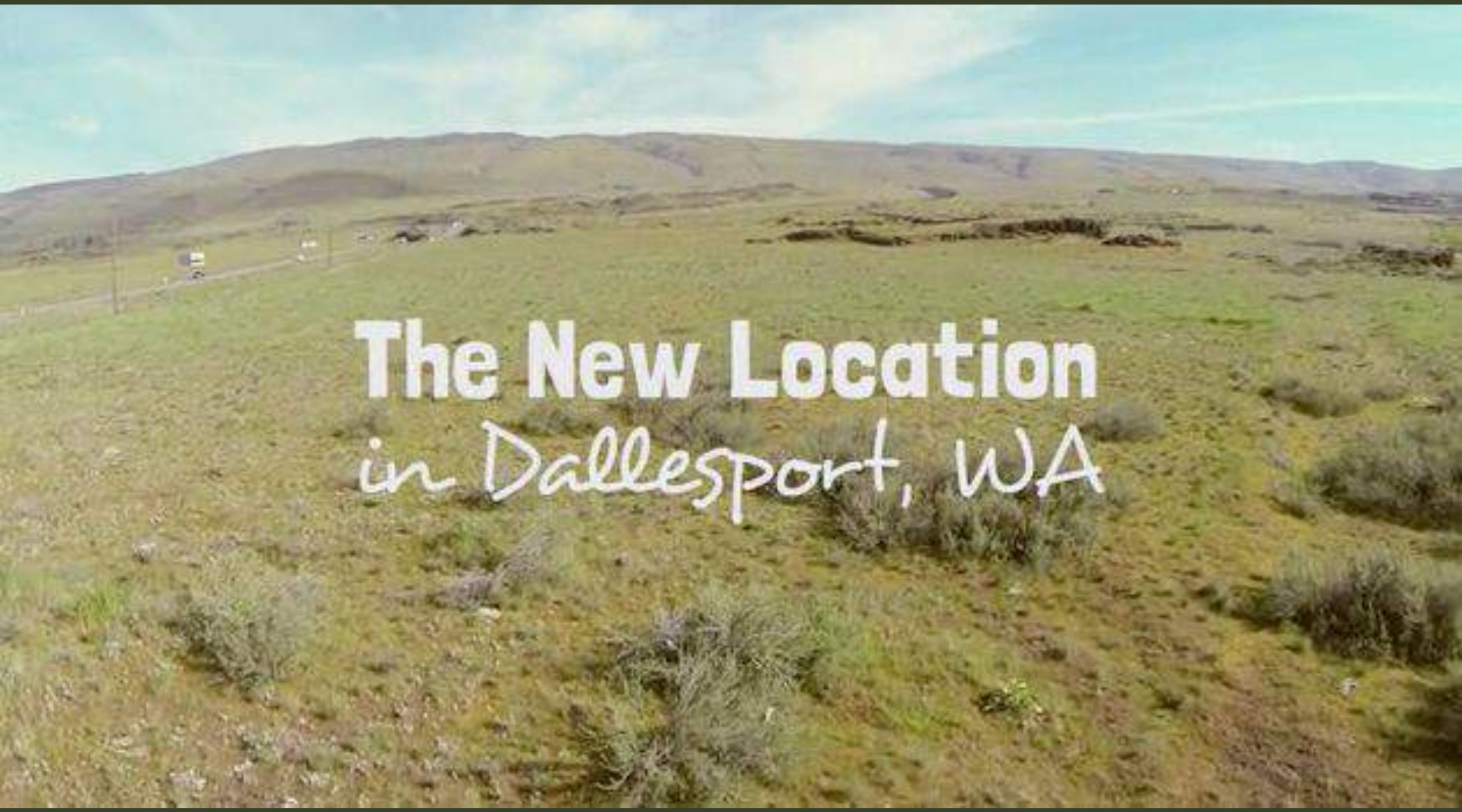
Dirt Hugger

2010

Dirt Hugger


2010


2010 -2014
BLACK GOLD MINE



Dirt Hugger

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Leachate Pond
Sediment Trap
Yard Debris
Tipping Area 2
Ground Yard Debris
Stage Two
Compost Curing
Screener
Stage One
Aeration Pad
Tipping Area One
Retail Area
Fresh Water Pond

Leachate Pond
Sediment Trap
Yard Debris
Tipping Area 2
Ground Yard Debris
Stage Two Compost Curing
Screener
Stage One Aeration Pad
Tipping Area 1
111 E Rockland Rd. Dallesport, WA, 98617
Retail Area
Fresh Water Pond

Permitting Experience

- Permits Required
  - ✔ SEPA – 100K TPY
  - ✔ Land Use Variance
  - ✔ Conditional Use Permit
  - ✔ Solid Waste – 100k TPY
  - ~~✔ Water Quality~~
  - ✔ Air Quality 100k TPY

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	Dirt Hugger Air Quality Permitting Timeline		
Date	**Event**	**Costs**	**Payee**
10/17/2016	AQ permit modificaton received by Ecology	$875	
6/26/2017	Follow up- Ecology suggests not processing the 50k TPY permit so that a 100k TPY permit may be submitted		
9/12/2018	2nd Air Quality Permit Application Received	$625	CRO AQ
1/29/2019	AERSCREEN modeling is requested	$1,500	laude Williams PE
2/5/2019	AERMOD modeling is requested	$5,000	Ramboll
3/19/2019	Tier 2 review is required by AQ.	$1,000	DOE
5/9/2019	Draft NOC approval order delivered (review costs to date DOE)	$11,027	CRO AQ
5/31/2019	AERMOD modeling is complete	$22,212	Ramboll
6/13/2019	ORIA assistance. Internal review by DOE		
9/17/2019	Final Permit Issued (DOE AQ 232 hours)	$22,665	CRO AQ
Budgeted Costs		$875	CRO AQ
Actual Costs	**(DH 330 hours on permit)**	**$48,877**	

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Sticking Points

1. VOC – EFs (80% of time on this)
    1. SJVACD 2010 vs CARB 2015 & Maricopa 2018
    2. Public Records Requests
    3. Composting Experts (John Cleary, ECS, GMT)
2. On Site Testing
3. Capping Material
4. BMP vs BACT
5. Engines – non-road vs stationary

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Table A-3: SJVAPCD VOC Windrow Greenwaste Emissions Testing Data

Site	Sampling Age of Material	Season Samples Taken	EF (lb-VOC/wet ton)
CIWMB (Modesto)	Over the Active + Curing Phase (days not sampled were interpolated)	Fall	0.85*
Site X		Spring	6.30
NorCal Jepson Prairie (Vacaville)		Summer	5.65
Northern Recycling (Zamora)		Spring	10.03
Average			**5.71**

*1.54 was identified in the green waste report after a recalculation to better represent other sites; however, 0.85 was the actual value reported from this test site and will be used in the EF determination.

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Public Records Request

Facility Name	VOC (lbs/ton)	Volume	Units	Tons	Feedstock	Stockpile EF	VOC (lbs/ton)	NH3 (lbs/ton)
Stemilt	1.626	30000	CY	7,143	I,II, III	0	1.626	N/A
Kittitas	2.85	n/a		6,000	I, II	0	2.85	
Chelan Co Compost	0.64	1000		1,500	i, II, sludge	0	0.64	
Entiat	1.78	n/a		7,000	biosolids	0	1.78	1.43
Average	1.72						1.72	
Lbs/ Year @ 100k TPY							172,346	
DH @ 100k TPY							86.17	
Order of manitude higher DOE recommended vs CRO.							3.31	

Dirt Hugger

From: Tim O'Neill
Sent: Monday, July 23, 2018 11:21 AM
To: Vicente, Ryan (ECY) <rvic461@ECY.WA.GOV>
Subject: RE: Emission factor documents

Hello Ryan,
I got permission this a.m. from one of the site owners to send you the study. Please find it here attached. The study was conducted on aerated static piles with a 6"-12" bio-layer that were composting a very rich mix (40%FW + 60% GW) over a pipe-on-grade aeration floor (which we supplied) that could provide a semi-uniform air flow. Nonetheless the overall VOC emissions from the active composting process was measured at 1.6 lb VOC/wet ton and from the curing phase at 0.4 lb VOC/wet ton. A more uniform and highly aerated agitated composting process, such as the one at Dirt Hugger, will convert more of the bio-available carbon into CO2, and less into VOCs. The result will be lower life-cycle VOC emissions.

If/when I get permission from the other facility operator I will forward that study as well.

Let me know if you'd like to discuss this further.

Best regards,

Tim O'Neill
President
Engineered Compost Systems
O: 206.634.2625

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US Composting Council®

USCC Position Paper:

VOC Emissions from Composting

The types and volumes of VOCs emitted from properly operated commercial composting facilities are naturally occurring (biogenic) and do not pose significant risk to the formation of ground level ozone

There is currently no evidence that, where they have been implemented, costly emission reduction requirements for composting operations have resulted in any improvement towards attaining Clean Air Act goals. Composting is in fact recognized by the EPA as an environmentally beneficial process, stating that the "composting process has been shown to absorb odors and treat

Feedstock Throughput

Category	Annual (tpy)
Existing	25,000
Increase	37,633
Proposed	62,633

Maximum Onsite Capacity

Category	Peak Onsite[1] (tons)
Stockpile	2,231

[1] Compost density: 0.5 ton/yd^3

Total VOC Potential to Emit (PTE)

Period	Uncontrolled	Controlled	Units
Existing (compost)	71.4	-	tpy
Engines	1.718	1.718	tpy
Proposed	226.4	99.99	tpy

Total NH_3 PTE

Period	Uncontrolled	Controlled	Units
Existing	25,250	-	lb/yr
Proposed	96,288	79,665	lb/yr

Composting VOC PTE (annual)

Period	Uncontrolled	Controlled	Units
Stockpile[1]	45.83	11.46	tpy
Active Phase	125.17	2.50	tpy
Biofilter	0.00	30.67	tpy
Curing Phase	53.65	53.65	tpy

[1] Stockpile exists: 153 days/yr

Composting NH_3 PTE (annual)

Period	Uncontrolled	Controlled	Units
Stockpile	33,028	25,845	lb/yr
Active Phase	44,281	886	lb/yr
Biofilter	0	33,957	lb/yr
Curing Phase	18,978	18,978	lb/yr

Utilized Emission Factors

Pollutant	Value	Units
NH_3 - stockpile	0.0968	lb / wet ton /day
NH_3 - windrow	1.01	lb / wet ton
VOC - stockpile	0.269	lb / wet ton /day
VOC - windrow	5.71	lb / wet ton

Emissions Distribution

Phase	Emissions (%)	Duration
Active (primary)	70%	Initial 14 days
Curing (secondary)	30%	Remaining time

Negative Aeration Capture Efficiency

Pollutant[1]	Value	Units
any	98%	-

[1] Assumed

Control/Destruction Efficiencies

Pollutant	Value	Units
NH_3	21.8%	lb / ton throughput
VOC	75%	lb / ton throughput

VOC Emissions Breakdown

2,231 ton stockpile
153 days per year (stockpiling)
62,633 tons per year composted

Stockpile (lb/wet-ton/day)

0.2685 (1)

- 0.0671 — 25% emitted from stockpile (2) → 11.46
- 0.201 — 75% destruction by psuedo biofilter (2)

Composting (lb/wet-ton)

5.71 (3)

- 1.713 — 30% emitted in curing phase (2) → 53.65
- 3.997 — 70% emitted in active phase (2)
  - 0.0799 — 2% emitted from mass bed (4) → 2.50
  - 3.917 — 98% collected from mass bed (4)
    - 0.979 — 25% emitted from bifilter (2) → 30.67
    - 2.94 — 75% destruction by biofilter (2)

Stationary Engines (tons)

1.718 (5) → 1.72

Total 99.99 tpy

Sources

1. Average of derived emission factors from information presented in: "Air Emissions Source Test- Emissions Evaluation of Complete Compost Cycle VOC and Ammonia Emissions" at Jepson Prairie Organics Compost Facility, Vacaville, CA, issued 5/2006; and "Northern Recycling Zamora Compost Facility Baseline Air Emissions Assessment | Air Emissions Source Test, Revision 2" at Northern Recycling, near Zamora, CA, issued 5/2009.

2. Emissions Testing of VOCs from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley, issued 10/2007.

3. San Joaquin Valley Air Pollution Control District's "Compost VOC Emission Factors" report, issued 9/2010.
4. Conversation with Claude Williams on 2/5/2019.
5. Email from Annie Klinke on 6/12/2019.

Sticking Points

1. ~~VOC EF's~~
2. On Site Testing
    1. No, Yes, But…
    2. 25.3 vs TO12 vs Other…?
3. Capping Material
    1. Screened Finished Compost ($$$, fuel, labor)
    2. Unscreened Finished Compost ($150k less)
    3. Overs (20% capacity)
4. BMP vs BACT
    1. Feedstocks & Operations
    2. Building
5. Engines – non-road vs stationary
    1. 6,901 gallons (74%) vs 2,476 gallons (26%)
    2. $22k in modeling
    3. Loss of ability to experiment/innovate

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2018


April 2019


May 2019


June 2019

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Dirt Hugger Marginal Costs for Expansion Under New Permit	
Item	**Cost**
Marginal Capital Costs of Negative Aeration (vs. existing + air)	
North Pad	
Above Grade Manifolds & Biofilter Piping	$84,000
Biofilter pad paving	$23,100
Blower Increase for Negative	$27,500
Retro Fit South Pad	
Above Grade Manifolds & Biofilter Piping	$114,500
Biofilter pad paving	$10,800
Labor for Install	$26,125
Negative Aeration Engineering + Increased Permit Costs	$46,378
Total CapEx	$332,403
Total Expansion Project CapEx	$1,517,919
Permit Increases in CapEx Costs	22%
Operational Costs (per year)	
Increased Power Consumption (negative is 3x more than +)	$24,960
Biofilter Construction/Maintenance (2-3 yr cycle)	$9,800
Biofilter footprint lease ($150/mo)	$1,800
Total OpEx	$36,560
Debt Finance (4.69%)	$8,228
Calculations	
Increase in permitted capacity (40K TPY to 62.7K TPY)	22,700
CapEx Cost/Ton/5 Yr	$2.93
OpEx Cost/Ton	$2.0
Marginal Cost/Ton for Expanded Capacity	**$4.90**

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Reflections, Take Aways + Tips

- Same Goals
- More Front-End Alignment. Bring in Experts Earlier
- Flow Chart for Permitting? Based on scale?
- Reduced Cost Testing Protocol
- Standard WA EF's? At what cost?

We Are the Change

- Process Transparency
- Consistency Across State – Good Data!
- Macro vs Micro View
  - Ozone precursors/ Non-attainment
  - Biogenic
  - Opportunity Costs

IMPACTS

- Over 100,000 yards of product sold
- Over 160,000 tons composted
- 25 full time jobs created
  - (4 per 10k TPY vs. 1)
- 17,899 tons CO_2 Reduction/Year
  - 2 million gallons gas
  - 93 rail cars of coal
  - 7 million propane bbq's
  - 3200 cars