



Technology and Hubris vs Common Sense
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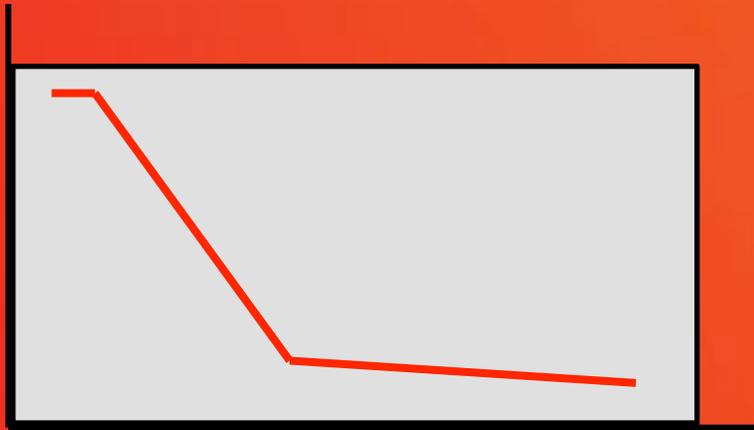
Facility

- 100 to 200 tpd SSO composting facility
- Fully enclosed proprietary tunnel composting system
- Rural Location – agricultural area
- State of the art SCADA system
- Four part odor control system



Issues

- Facility operating more than a year with persistent odor impacts
- Owners had engaged residence early
- Formed residence group and had many meetings with residence
- However, relations with neighbors deteriorated
- They had promised ZERO odor



Initial Steps

- Enclosed curing area
- Hired a public facilitator
 - ✓ Reestablish community discussions
 - ✓ Odors will be very rare and not impact life
 - ✓ Facilitator hired technical adviser

Consequences of Poor Relations

- Press involved
- Regulator regular monitoring and involvement
- Residence and press develop their own theories for causes
 - ✓ C/N Ratio incorrect
 - ✓ Diapers in waste
- Theories have to be addressed
- Trust was lost

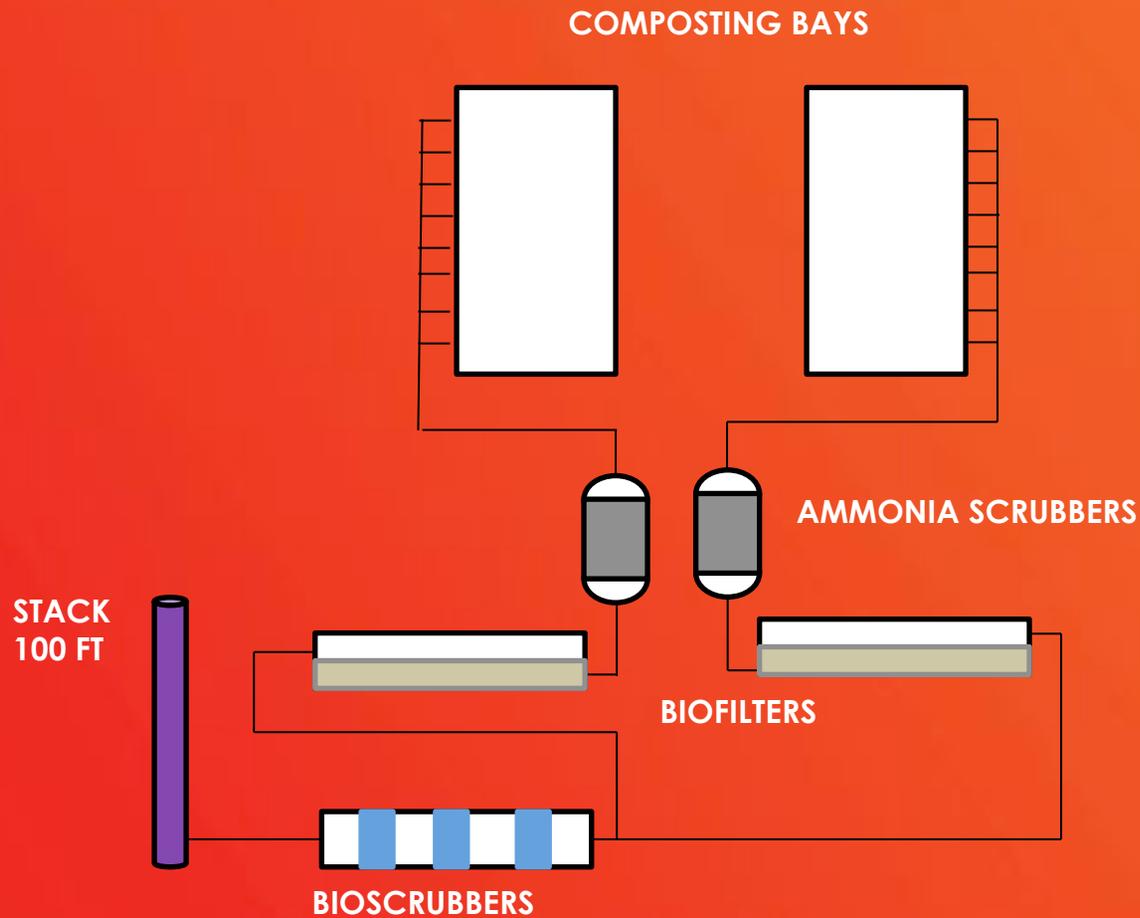


How Things Progressed

- **Facilitator eased tensions with residence**
 - ✓ Got the two sides talking again
- **Owner began to feel they had done all they needed to do**
 - ✓ Their facility was state of the art
 - ✓ 4 levels of odor control
- **Owner reluctant to have outsiders inside the facility**
 - ✓ Facilitator had panel of experts give opinion about facility
- **Regulators forced the issue and required independent third party review of facility**
 - ✓ Facility on reduced tonnage until something improved

Facility Configuration

- Two separate trains caused uneven loading of biofilters



Facility Evaluation

Goals – Find odor source

- Fugitive emissions?
- Poor system performance?
- Both?

Poor Performance

- **Air & water testing**
 - ✓ Air input and output of each component
 - ✓ Water feeding scrubber and in sump
- **Inspection of all components**
 - ✓ Visual and smoke test all parts of the facility – tunnels through stack
- **Performance data review**
 - ✓ Good records of everything available from SCADA

Water Testing

Sample Description	Sample ID	Dissolved O ₂ mg/l	pH	TSS mg/l	NH ₃ mg/l	Nitrate mg/l	Nitrite mg/l	Sulfide mg/l	BOD mg/l
Bioscrubber water below spray intake	BS-1	5.46	7.94	38	12.1	ND	ND	ND	28.5
Bioscrubber spray water (newly added)	BS-2	0.83	7.34	33	71.5	ND	ND	ND	55.1
Stormwater Retention Pond 1 (north)	P-1	7.16	8.16	64	0.395	ND	ND	ND	15.6
Stormwater Retention Pond 2 (south)	P-2	7.13	8.01	29	25.1	2	ND	ND	11.9



Air Testing



Compound	Biofilter Inlet	Biofilter Outlet	Biofilter Removal Eff. ¹	Stack	Bioscrubber Removal Eff.	System Overall Removal Eff.
Odour (D/T = OU/m ³)	15,030	11,295	25%	6,266	45%	58%
Hydrogen Sulfide (ppb)	ND	19		48	-153%	
Carbonyl Sulfide (ppb)	24	22	8%	18	18%	25%
Methyl Mercaptan (ppb)	190	99	48%	76	23%	60%
Dimethyl Sulfide (ppb)	130	88	32%	70	20%	46%
Carbonyl Sulfide (ppb)	13	12	8%	10	17%	23%
Dimethyl Disulfide (ppb)	48	14	71%	16	-14%	67%

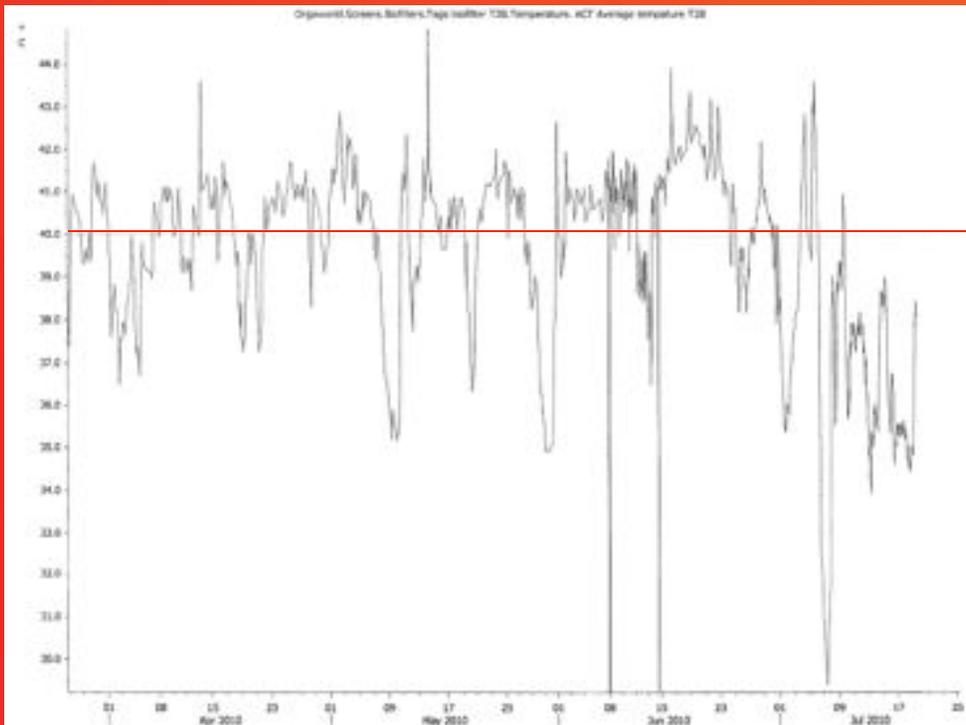


Operational Data Review

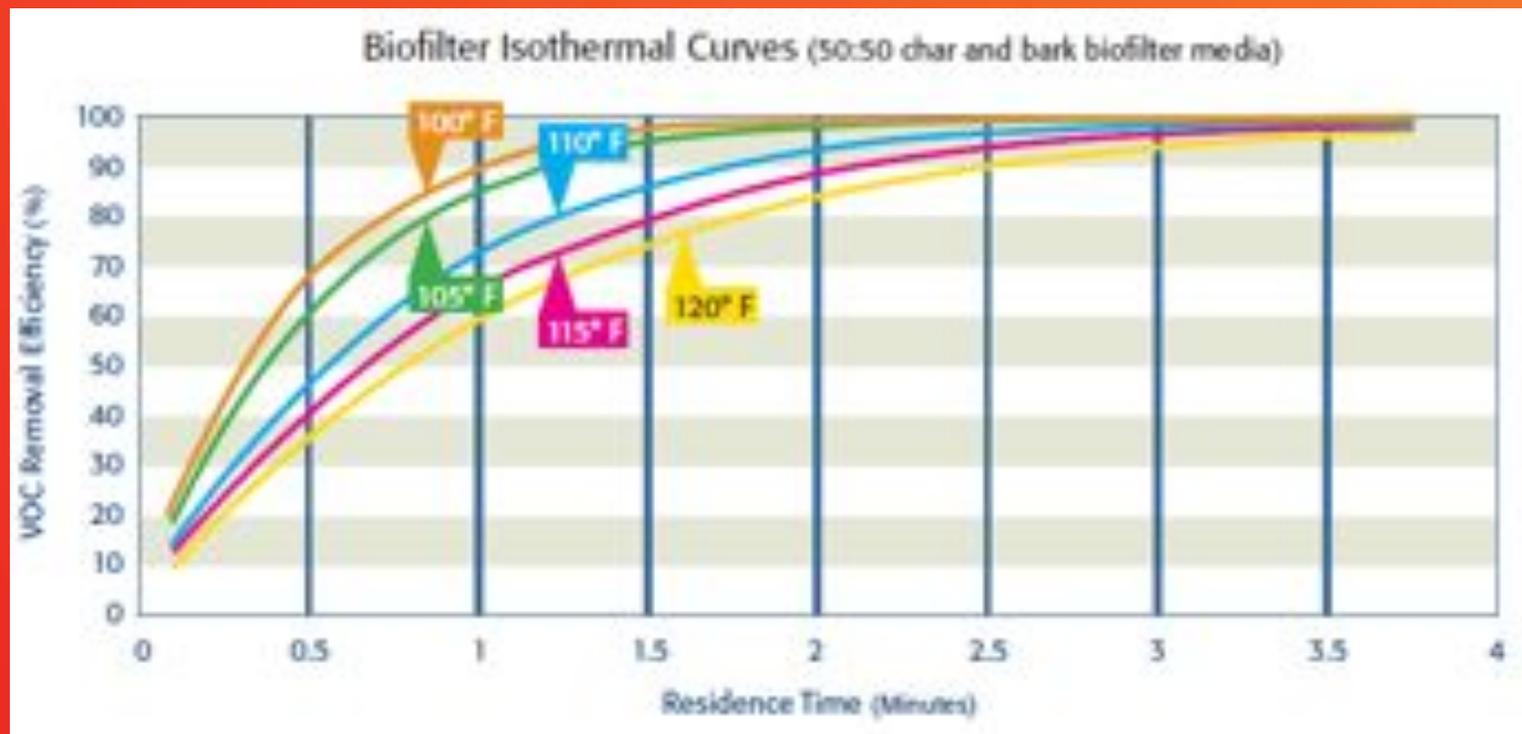
Biofilter Cell	Airflow (m ³ /hr)	Media Volume (m ³)	Residence time (seconds)
Biofilter T2A	35,000	323	33
Biofilter T2B	40,000	323	29
Biofilter T3	72,000	646	32
Biofilter T4	33,000	646	70

Biofilters

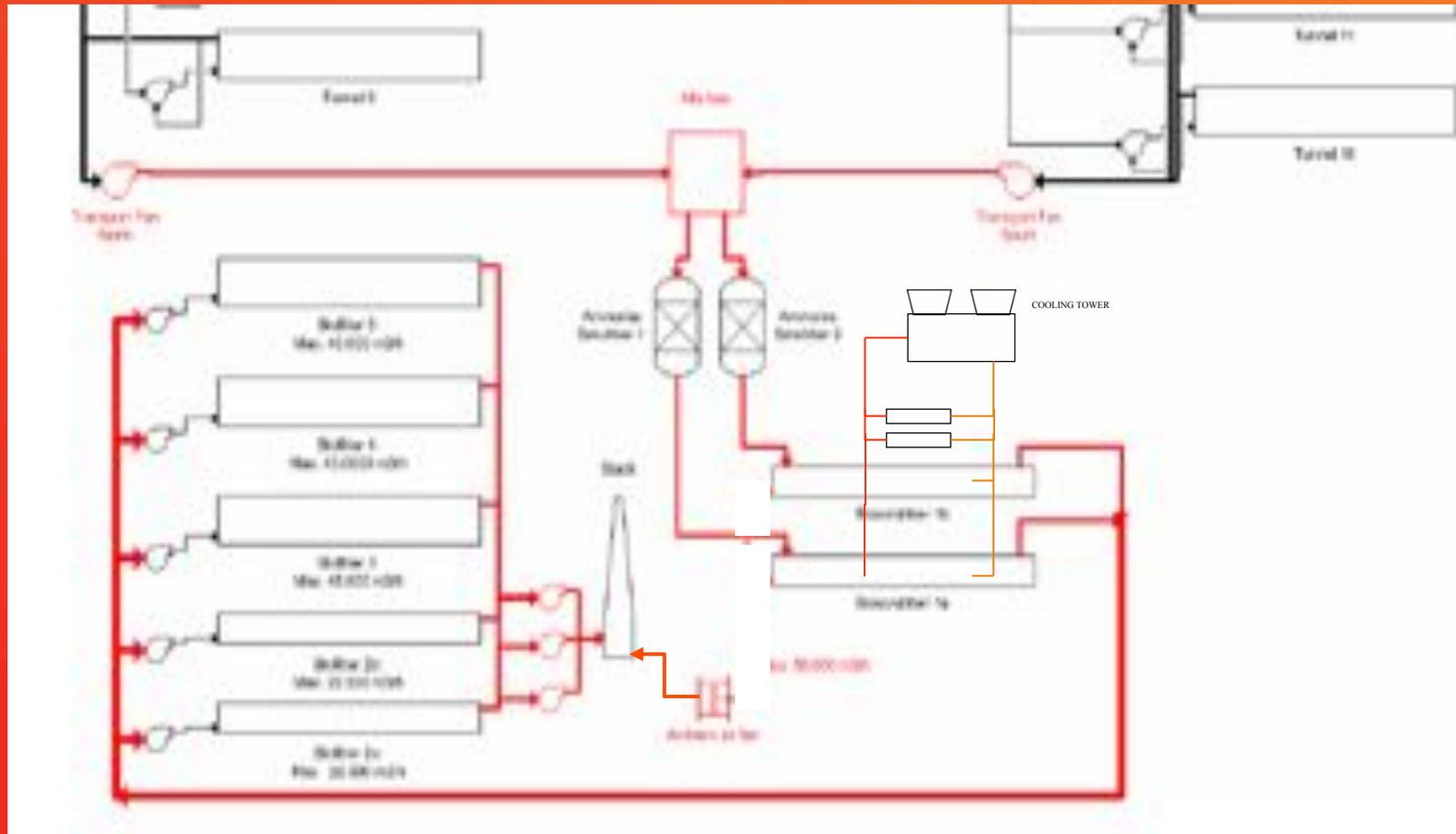
- Low residence time
- Temperatures fluctuates from mesophilic to thermophilic – above and below 40°C



Need to Improve Biofilter Conditions



Improvements Made

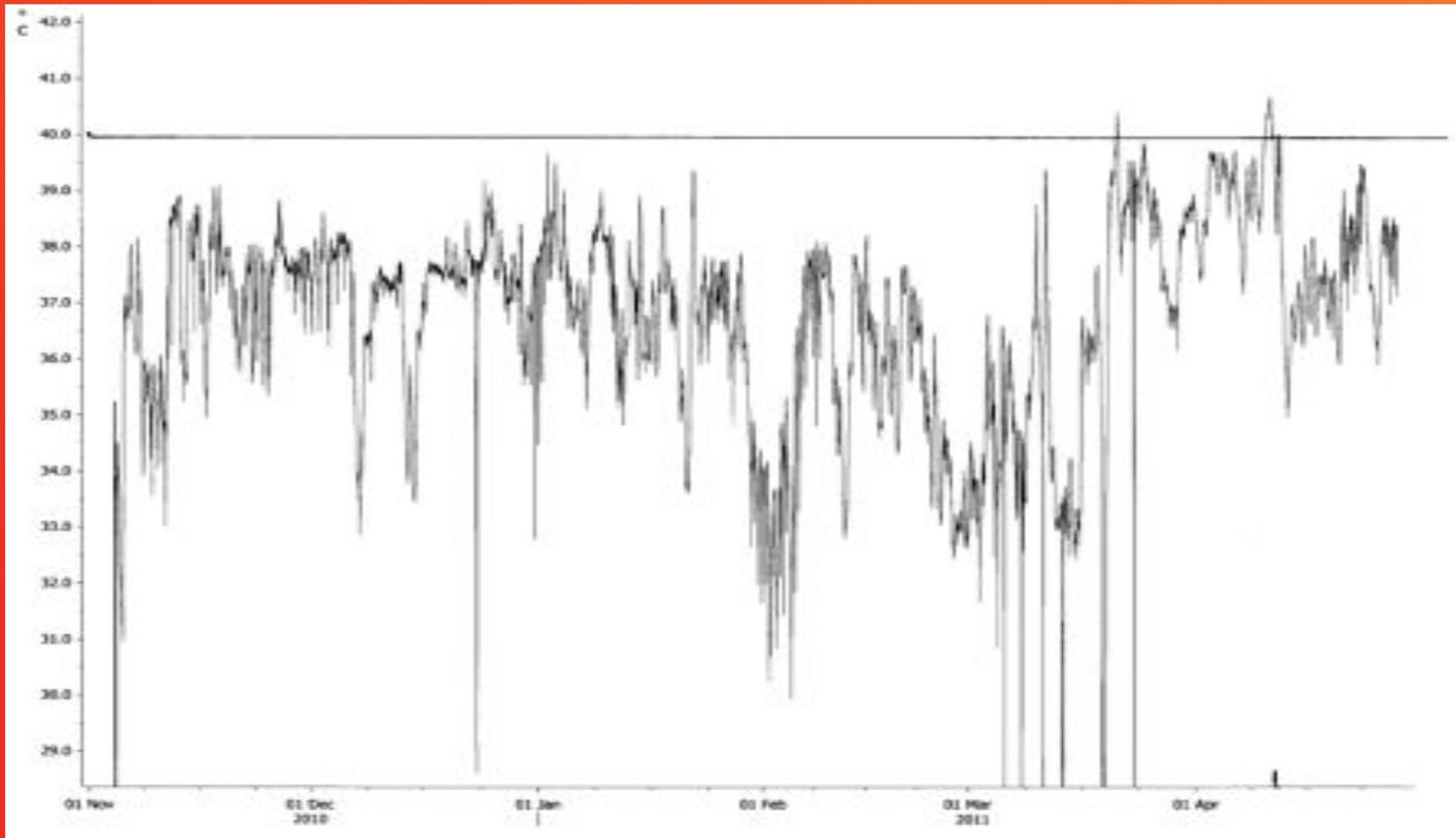


Other Things The Owner Did

- Increase the stack height from 100 ft to 140 ft
- Add dilution air at the stack



Impact of Cooling Towers



Not Quite There

- Still some complaints
- Routine air sampling showed poor biofilter performance

Location	Average Odor Concentrations (D/T)
Between composting and ammonia scrubbers	27,525
Between ammonia scrubbers & bioscrubbers	15,395
Between bioscrubbers and biofilters	8,013
Between biofilters and stack	5,256
Exiting the stack with dilution air included	2,486

Not Quite

- Individual flows measured did not match SCADA
- Total flow to Biofilters did not match flow at stack

Biofilter	SCADA Readings	Flow Measured
1 & 2	38,823	57,318
3	37,628	18,488
4	30,061	Instrument failure
5	45,366	Instrument failure
Total Foul Air	152,878	97,941

“The most incomprehensible thing about the universe is that it is comprehensible.”

Albert Einstein