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CANADA'S BEST MANAGED COMPANIES

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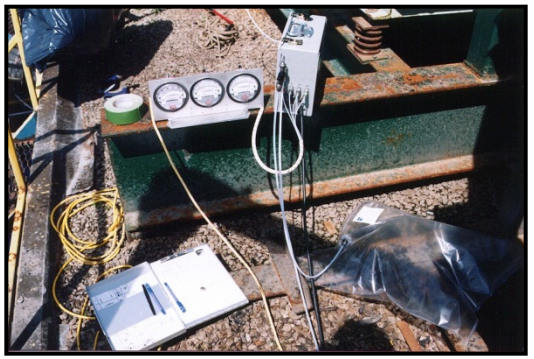
Dealing with Odour Compliance and Odour Control Pilot Study





CANADA'S BEST MANAGED COMPANIES

Brad Bergeron
2014-09-24

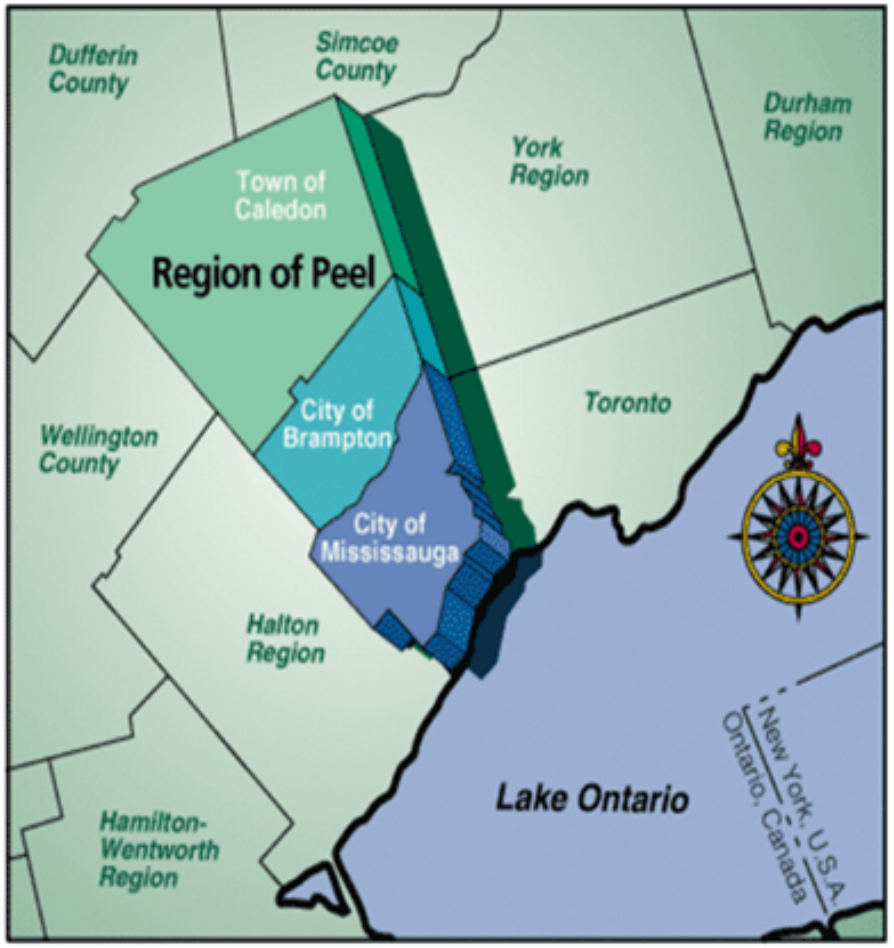
Agenda

- Overview of Region of Peel Curing Facility
- Brief History of Region of Peel Composting
- Initial Odour Studies Completed for Site
- New Obstacles - Odour
- Discussion and review of Pilot Results

Background

City of Brampton ~ City of Mississauga ~ Town of Caledon

- Population: 1.3 million
- The Region services 300,000 single family households, and 88,000 apartment/condo/town house units
- 445,000 tonnes of residential waste managed in 2007, with a 50% diversion rate
- Regional goal to divert 70% of waste from disposal by 2016



Initial Composting

Initial Composting - 1995

- Source-separated organic waste collection in Caledon
- Two-phase composting technology
  - Primary Composting In-Vessel
  - Secondary Composting open windrow for 3 to 4 months
- Successfully operated for ten years
- Design Tonnage capacity of 12,000 tonnes

Expanding Composting Operations

- **Collection was expanded to include approximately 300,000 households**
  - Selected the same tunnel/windrow technology for the Peel Integrated Waste Management Facility (PIWMF)
  - Design Tonnage capacity of 60,000 tonnes
  - 280 tonnes of material were placed in each biocell
    - 160 tonnes of organic food wastes
    - 120 tonnes of leaf and yard wastes

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WINDROW COMPOSTING PHASE

Peel Curing Facility:

- Open Windrow
- No Forced Aeration
- Periodic Turning

Residence time: 3 - 4 months

Odour Complaint Background

- Numerous odour complaints from the neighbours of the curing site during the period of April to June, 2007
- Staff started investigation to reduce odours
- Operations at the Peel Curing Facility suspended in June 2007
- Compost from primary systems sent to 3rd party curing facilities

Region of Peel Evaluates GORE™

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- The Gore™ Cover System is used a complete composting system in many installations (primary and secondary)
- Peel proposes to use the system as our secondary composting process

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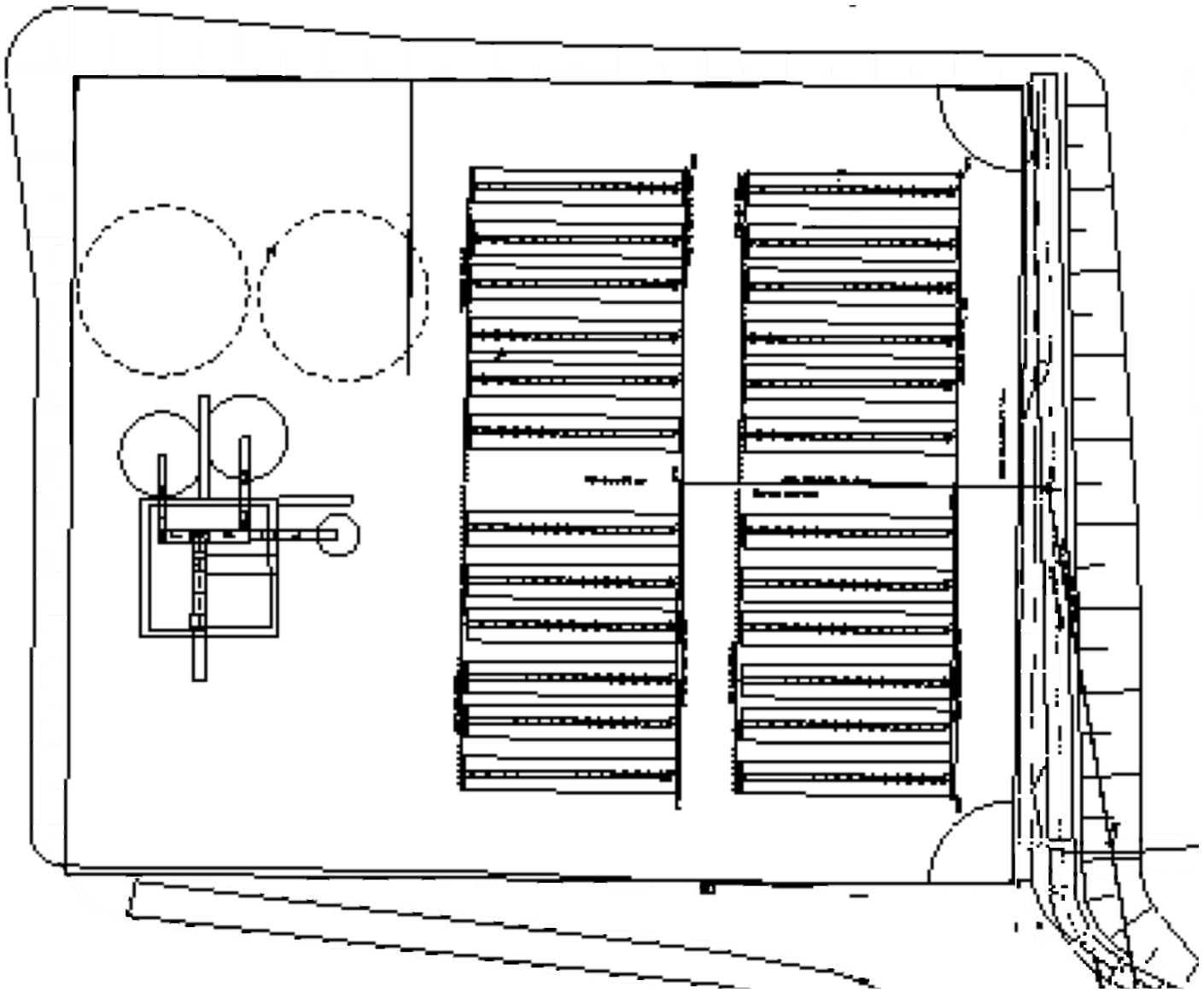
Composting Odour Results

End of Week	Odour			
	Covered		Uncovered	
	OU	Reduction (%)	Before Turning	After Turning
Start	2942			
1	2251	24		
3	2077	64		
4	555	81	547	
5	371	87	536	820
6	357	89	302	
8	181	94	180	436

MOE Requirements for Permit Approval

- MOE required that dispersion modelling demonstrated compliance with 1 OU over a 10-minute averaging period at sensitive receptor locations with allowances for frequency
- What is 1 OU?
  - Detection is usually the odour strength (OU) at which 50% of the normal population can detect an odour
  - Detection = 1 OU
  - Recognition/annoyance is typically 3-10 times higher than detection levels
  - Annoyance = 3-10 OU

Site Plan

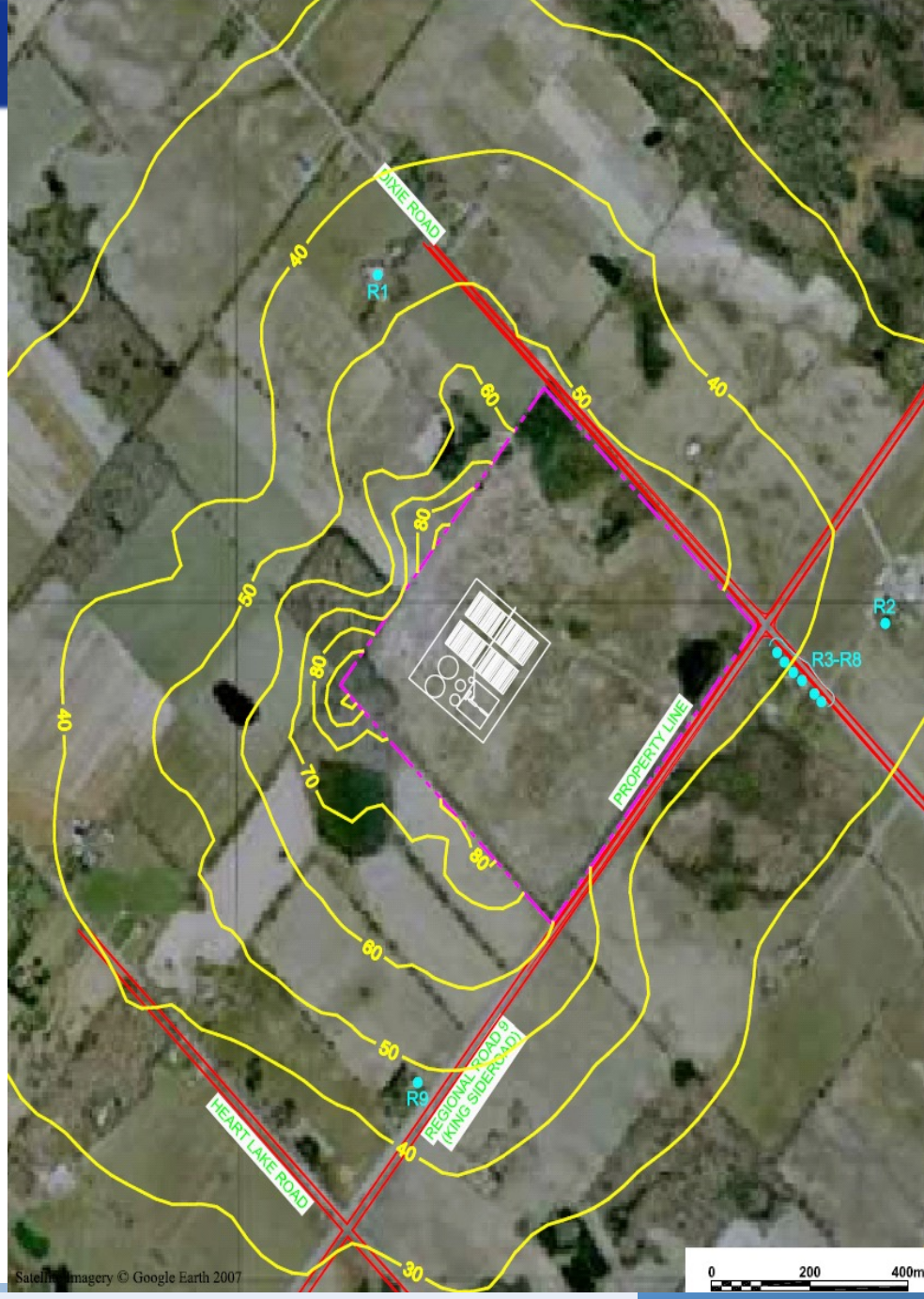


Results Without Covers

Odour Strength with the Previous System:

Events over 1 OU: 4-5% of the time

Events over 3 OU: 2-3% of the time

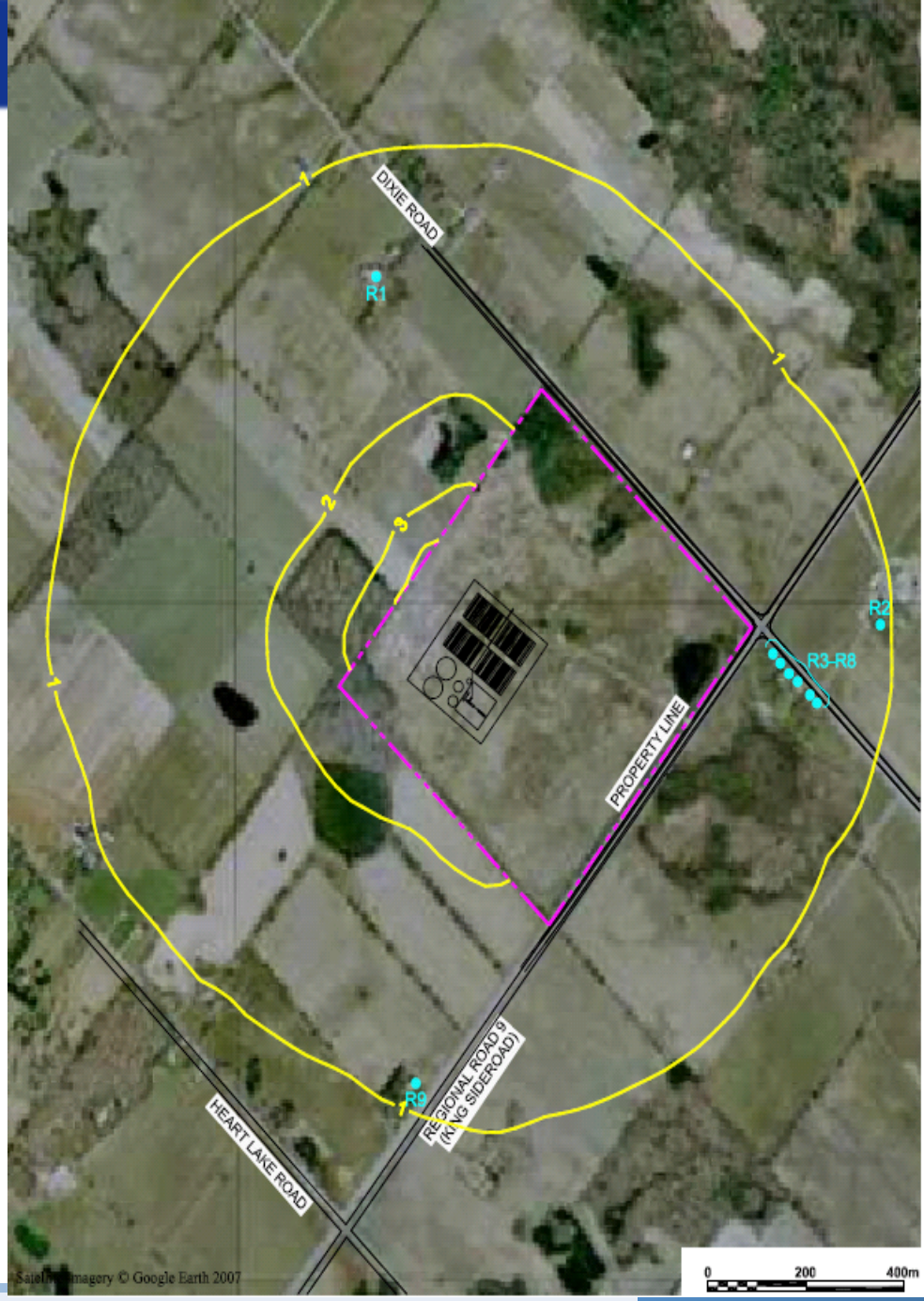


Model Results with Cover

Maximum Odour Strength

Maximum at R1: 1.5 OU

Events over 1 OU: 0.5% of time at R1



Status Today - Obstacles

- Facility received a permit to operate the site in April of 2008
- MOE required a source testing program at the site to commence after site operations started and be completed annually and results need to comply with ***1 OU performance limit***
- Site started receiving compost material in May of 2008
- Site representatives must complete routine odour observations and monitor meteorological conditions to ensure the new material is not received during odour events

Data Collection

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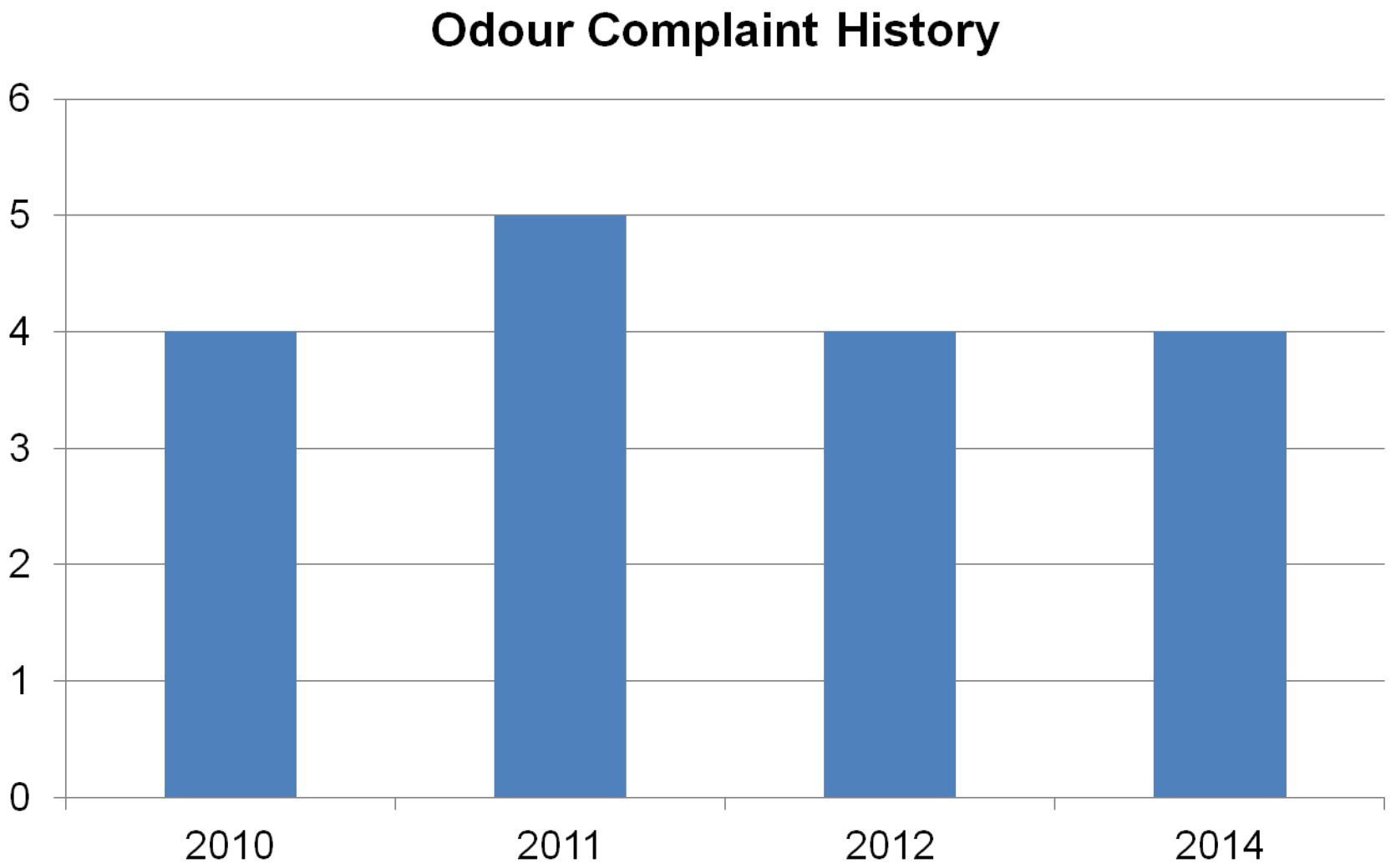
Summary of 2008 to 2013 Odour Data

Week	2008 Pilot Project Odour Concentrations (OU)	2010 PCF Odour Testing Odour Concentrations (OU)	2011 PCF Odour Testing Odour Concentrations (OU)	2012 PCF Odour Testing Odour Concentrations (OU)	2013 PCF Odour Testing Odour Concentrations (OU)
Incoming	2947	382	308	654	576
Week 1	2290	400	177	506	544
Week 2	No Data	248	275	529	792
Week 3	1062	142	231	247	498
	--	--		--	--
	--	200		--	--
Week 4	555	326	293	400	606
	547	No Data		No Data	No Data
	820	No Data		No Data	No Data
Week 5	371 (no turning event)	276	No Data	271	320
	536 (no turing event)	536 (no turing event)		No Data	No Data
	No Data	314		No Data	No Data
Week 6	357	224	No Data	122	311
	302	No Data		No Data	No Data
	414	No Data		No Data	No Data
Week 7	No Data	195	No Data	208	370
Week 8	181	124	No Data	190	71
	--	--		--	--
	180	No Data		No Data	No Data

Historical Odour Complaints



Historical Modelling Results

Operating Year	Range of Maximum Odour Concentrations Off-Site (OU)	Range of Frequency of Occurrence for Events greater than 1 OU
2010	2.5 to 4.1	0.2 to 1.3%
2011	1.8 to 2.8	0.1 to 0.9%
2012	2.4 to 4.1	0.2 to 1.4%
2013	4.0 to 7.5	0.4% to 1.8%

Main Issues

- Odour levels showed decrease in 2011 and increases in 2012 and 2013
- Facility continues to be above its performance limit
- Odour complaints remain minimal
- Very few concerns being raised at local PLC meetings regarding odour

Disconnect between odour performance limit and nuisance issue based on complaint history

Research

- ✓ Region of Peel hired an external consultant Lambert Otten to review the process, review feedstock, operations and final composting materials
- ✓ Region of Peel invites GORE™ to review system operation and ensure system is working properly
- ✓ Region of Peel meets with Local and Approvals Branch of MOE to discuss odour issued and options of consideration

Pilot

- Region of Peel began discussions with Maple Reinders (John Haanstra) about the potential benefits of using Zeolite material mixed with compost for odour control
- Initial data provided to RofP looked promising for use at the Peel Curing Facility
- RofP decides to proceed with Pilot Study of a limited amount of material at the PCF site to evaluate the benefits

- What is Zeolite?

According to Wikipedia….

"Zeolites are microporous, aluminosilicate minerals commonly used as commercial adsorbents and catalysts.[1] The term zeolite was originally coined in 1756 by Swedish mineralogist Axel Fredrik Cronstedt, who observed that upon rapidly heating the material stilbite, it produced large amounts of steam from water that had been adsorbed by the material."

Pilot

- In short, the zeolite material would combine with the compost materials and adsorb odour laden moisture residual from the compost material…but, in a mixture to not effect overall moisture content for proper curing
- According to the MSDS, material comprised of the following:
  - Zeolite mineral
  - Feldspar
  - Silica, crystalline, quartz
  - Mica
- Product is applied in a fine powder form

Pilot Test

- Region of Peel provide 2 control windrows for the 4 week study:
  - 1 windrow of compost material without zeolite material;

  and

  - 1 windrow of compost material with zeolite material applied with the 1st half consisting of 1% zeolite (by weight) and the 2nd half consisting of 3% zeolite (by weight)

Pilot Study

- Odour samples were complete on each of the compost rows during events:
  - Incoming material (prior to application of cover)
  - Week 1 (with covers)
  - Week 2 before turning (with covers)
  - Week 2 after turning (without covers)
  - Week 3 (with covers)
  - Week 4 (without covers)

Pilot Results – Uncovered Samples

Sample	Incoming	Week 2 (Uncovered)	% Change from Incoming	Week 4 (Uncovered)	% Change from Incoming
Control Sample (no Zeolite)	1040 OU	1300 OU	+25%	800 OU	-23%
Zeolite Sample 1 (1% Zeolite)	1200 OU	650 OU	-46%	420 OU	-65%
Zeolite Sample 2 (3% Zeolite)	2010 OU	300 OU	-85%	380 OU	-81%

All Results

Week	Control (No Zeolite)	Test 1 (1% Zeolite)	Test 2 (3% Zeolite)
Incoming	1040 OU	1200 OU	2010 OU
Week 1 (Cover On)	150 OU	140 OU	200 OU
Week 2 (Cover On)	370 OU	420 OU	310 OU
Week 2 (Cover Off)	1300 OU	650 OU	300 OU
Week 3 (Cover On)	520 OU	520 OU	350 OU
Week 4 (Cover On)	150 OU	150 OU	150 OU
Week 4 (Cover Off)	800 OU	420 OU	380 OU

Results and Steps Forward

Results

- Cover System still has good efficiency for odour control (Cover On Samples)
- Zeolite test samples seem to have increased odour reduction abilities when covers are off, after turning events, in comparison to Control Samples

Steps Forward

- Region of Peel is still pursuing the potential for completing additional studies to validate the results of the pilot study
- Considering expanding the program to include other specific compounds (amines, aldehydes, VOCs, and others)
- Region of Peel still needs to evaluate application methods and control processes for workers

Thank You!

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