HOW WILL BIOSOLIDS SMELL WHEN THEY REACH THE APPLICATION SITE?

AN ASSESSMENT OF ODOR MEASUREMENT TECHNIQUES AND THE IMPACT OF PLANT PROCESSES

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Biosolids Odor Evaluations

- Identify
Biosolids Odor Evaluation

- Impact on Odors
  - Co-Digestion
  - Lime Operations
  - Holding Time/
    Mechanisms of Transport
- Dewatering Polymers
  - Bench-scale Dewatering by Andritz using Different Polymers and Doses
- WTP Residual Discharges
  - Correlate WTP Residual Discharges with DAF and GBT Operating Difficulties and Biosolids Odors
Headspace Sampling

- Parameters Tested
  - Triethylamines (TEA)
  - Mercaptans
  - Dimethyl Sulfides
  - Ammonia (NH$_3$)
  - Hydrogen Sulfide (H$_2$S)
  - Amines

- Recorded Observations
  - Odor Descriptors
Lime Mixing

- Quicklime from Chemical Lime, Clifton Plant

- Some white clumps also apparent in dewatered cake prior to liming, perhaps grit
Land Application Site

- Odors are typically earthy with ammonia
- Ammonia disperses, lighter than air
Andritz Dewatering
Sampling Larger Scale
• Confirmed odors mostly caused by compounds measurable by gas detection tubes
• Lab analysis measured trimethylyamine, not triethylamine
Polymer Use

- Magnafloc LT-7995 – FTW Water Plants (confirmed use by all WTPs; only polymer used this year)
- MC-124A – VCWRF DAFTs (new polymer as of June 2013; cationic, but not an emulsion)
- A3330 – VCWRF Digester Thickeners
- C6278, C6T78 TDS – VCWRF Gravity Belt Thickeners
- A3310, A3310T – VCWRF High Rate Clarifier
- Zetag 7583 – Renda Dewatering
Impact of Polymer

- Polymers Tested
  - Low Dose Zetag 7583 (13 lbs/ton solids)
  - High Dose Zetag 7583 (19 lbs /ton solids)
  - C6278 (GBT polymer)
  - Mannich Polymer (provided by Polydyne)
  - Renda’s Cake (10 lbs/ton solids)

- First-run results suggest Zetag 7583 dewatering polymer may contribute to odors more than polymer used at GBT and Mannich polymer recommended by Dr. Tichenor

- Additional testing needed to verify if switching polymers would measurably impact odors
Impact of Polymer
Triethylamines by Days Sampled

Headspace TEA (ppm)

Headspace Sampling Day

GBT Polymer
Mannich Polymer
From Renda's Facility
Low Dose of Zetag
High Dose of Zetag

GBT Polymer
Mannich Polymer
From Renda's Facility
Low Dose of Zetag
High Dose of Zetag
Lime Dose

Renda’s Lime Mixing

14-percent Lime

28-percent Lime

7-percent Lime

21-percent Lime
Lime Dose

- Addition of lime to biosolids appears to off gas amines and ammonia
- Lime mixed for 5 minutes by hand
- Clumps generated upon impact with wet sludge difficult to incorporate
Impact of Lime Dose
Triethylamines by Days Sampled

Before Lime
Renda (7-percent)
7-percent
14-percent
21-percent
28-percent

Headspace TEA (ppm)

Headspace Sampling Day

Before Lime
Renda (7-percent)
City of Fort Worth Biosolids Odor Evaluation
Percent Solids by Lime Dose

Sample Bucket

Renda
7
14
21
28

First Sampling Event % Solids
Second Sampling Event % Solids
Questions and Answers

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