Western Australian Biosolids

- Regulatory framework and research
- Overview of Western Australian Biosolids Beneficial Use Program
- Today's challenges and benefits
- Odour monitoring for land application

WA biosolids guideline changes

- New title *Western Australian guidelines for biosolids management (Dec 2012)*

- Living document to include further research and best practice management

- Based on local and National research

- Stronger focus on the receiving environment

- Reduction biosolids and soil monitoring

- Reduction of management control ie fly monitoring

- More self regulation (built around trust)

•EP Act (WA) 1984

•Health Act 1978

WA biosolids guideline-Contaminants

- NBRP – metals project
  - Reduction of metals analysis
  - Move from total Cr to Cr VI (1 mg/kg dry wt)
- Pesticides
  - Chlordane and Dieldrin
  - Most have been banned for years
  - Below LoD in most biosolids and sludge

WA biosolids guideline -classification

- For continuous production processes
  - validated WWT processes
  - large volumes of reliable data

Reduction of parameters i.e. Bio-metals 02 + Bio-Pesticides 01

- For intermittent production processes

Standard metals i.e. Bio–metals 01+ Bio-Pesticides 01

- Overall classification calculation is the same
  - metals and pesticides - Maximum Allowable Contaminant Concentration (MACC)

with the exception of

  - Cu, Zn and Cd - Maximum Permissible Concentration (MPC)

WA biosolids guideline - Pathogens

- Treatment process parameters
  - solids retention time (>15days)
  - temperature (38°C ± 3°C)
  - >38% Volatile solids reduction
  - <2 000 000 count /g dry product
- Mesophilic digestion **only**
  - solids retention time (>15days)
  - temperature (38°C ± 3°C)
  - >38% Volatile solids reduction
  - pathogen log reduction 1.5 (count reduced across digestion process)
    - <2 000 000 count /g dry product (process investigation trigger)

WA biosolids guideline - Pathogens

- Remove salmonella; add coliphage FNA + somatic coliphage (viruses that infect coliform bacteria)
  - Typically for unrestricted product (P1)
  - Maybe required to determine base line for a WWTP
- Above 26 parallel
  - Inclusion of strongyliodes with hookworm
    - Hookworm ova viability method -WWQB project

What Water Corporation is doing

- Sludge and Biosolids PCT's
  - determine critical control points (CCP)
  - alerts (~20% above "normal" value) and violations (regulatory limit)
  - with regions for endorsement
- Research
  - sub surface sludge injection trial and validation
  - development and validation method for detection of viable helminth ova in sludge (CSIRO PhD)
  - odour reduction is biosolids and sludge production (Curtin University phase II)

Issue -Water Corporation

- Product is still classified as a waste (regulator)
- Balancing demand that exceeds supply
- Sustainable cost effective “markets”
- Control of odours
- Continual improvement
- Continue to produce product that best meets needs of customer

Background

- Water Corporation 108 WWTP
  - 14 Metro
  - 95 regional
- Metro
  - Biosolids Cake
    - Stabilisation by mesophilic anaerobic digestion
    - Woodman Point WWTP 130 MGD
    - Beenyup WWTP 120 MGD
  - LAB
    - Stabilisation by Lime Treatment
    - Subiaco WWTP 60 MGD
- Regional
  - 79 oxidation pond processes
  - 16 Activated sludge processes (IDEA)

Current Business

- 5 year Metropolitan Biosolids Management Plan - Strategic Planning (2009-2014)
- Assessment of Markets for Biosolids in WA (Dec 2009)
- Product still regulated as a "solid waste"

  – moving to internal management systems with third party certification and auditing.
- Product development e.g. as slow release "fertiliser" & soil improver

  – moving to classification as unrestricted use and thus removing the need for intensive regulatory conditions
- Implementation of communication strategies

Security through diversity

- Focus is on diversifying i.e. compost/ agriculture/ forestry and ensuring viability in each market.
- By having many options reduce exposure to loss of any one delivery option.
- Ensure market security through “end user” contracts and/or agreements.
- Many markets also allows for meeting seasonal needs
  - Agriculture mainly summer months
  - Forestry good for winter months, assist with seasonal variations in demand
  - Composting can deliver all year round,

Biosolids Use in Agriculture

Biosolids Stockpile

Biosolids Spreading

Agriculture (2013/14)

- Annual application ~56,000 wet t
- Applications based on agronomic requirements, may be limited by nutrient loading
- Application rates 30 - 40 wet tonne per hectare

–Use farms that have good management practices,
–Cost effective (distance / transport costs).

- Farm meets environmental constraints that meet WA Biosolids Guidelines

– appropriate nutrient retentive soils,
– good buffering from neighbours, water etc,
– flat land,
– no public access.

Forestry

- Used for eight seasons (between 2003 – 2012)
- Trials led to first full application Aug 2003
- Application rates 170 wet tonnes / hectare
- Up to 5,500 Ha of Pines available

Annual Biosolids Distribution 2012/13

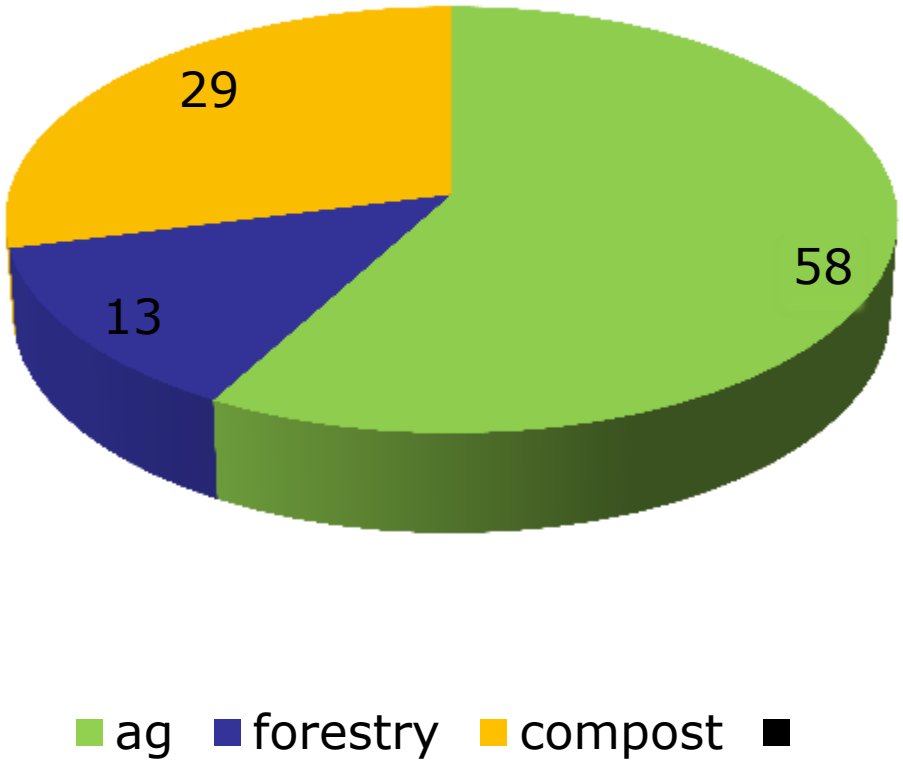
Dewatered Biosolids Cake

- Beenyup 31,700
- Woodman Point 40,100

- Agriculture 56,300
- Composting 28,100
- Forestry 12,600

Lime Amended Biosolids

- Subiaco 25,200
- Agriculture- all



Key Messages

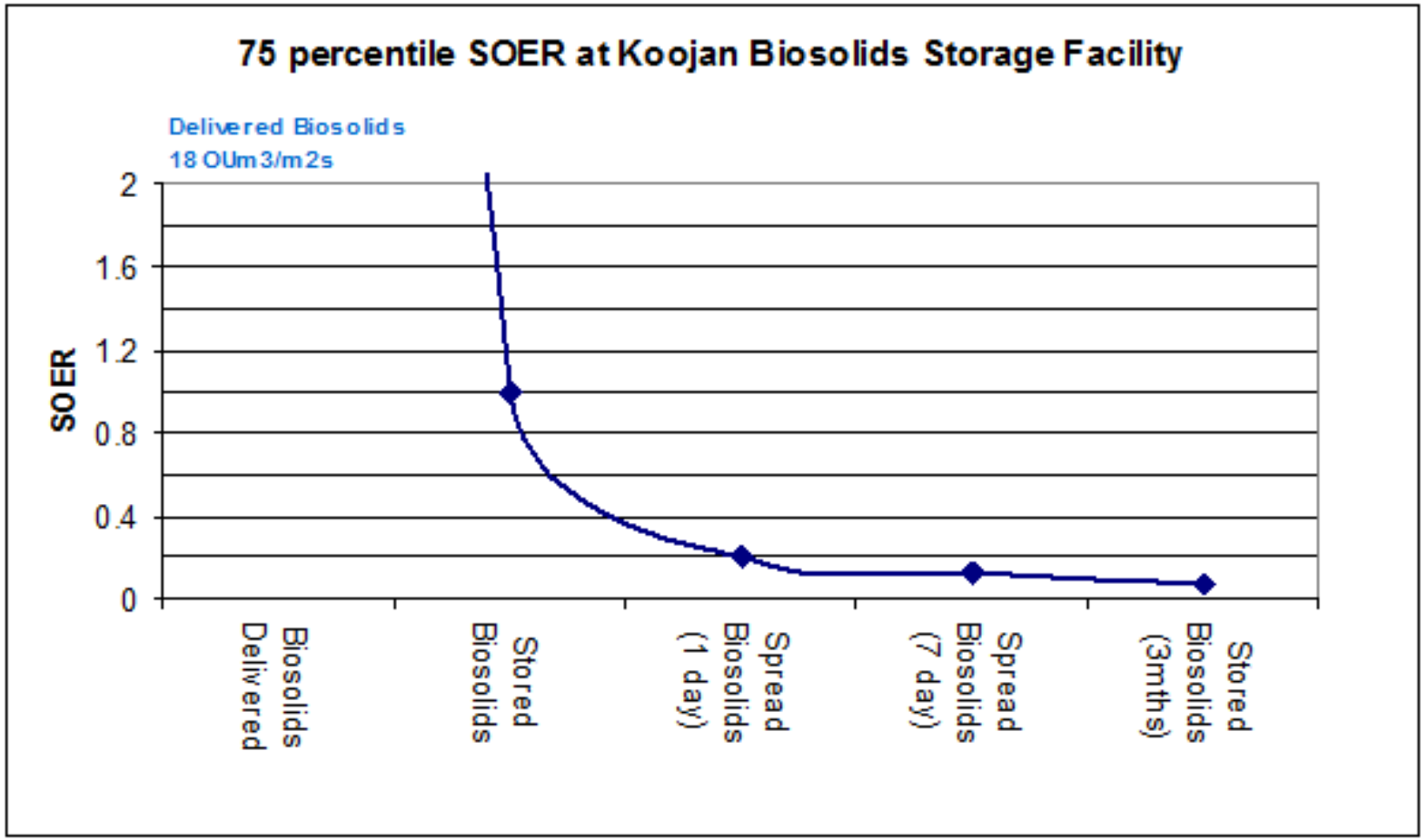
- Biosolids are not waste but many benefits
  - Highly beneficial, renewable natural resource.
  - Effective and efficient soil enhancer.
  - Nutrient Cycling, “closing the loop”.
  - Improved producer incomes; reduced input costs & nutrient ‘wastage’.

- The use of Biosolids has a net economic benefit.
  - disposal to landfill or other measures has none.

- Biosolids are safe
  - When correct management practises are applied


TEMPLES

Biosolids storage facility - odour



Odour survey results - Koojan

- The 75 percentile odour emission rates
- Ausplume model
- Winds measured on the site
- Stored
  - Modelling from data -noticeable odour extending for 400 m to 500 m.
  - Field survey confirmed sampling - odour detected maximum of 400 m
- Land applied
- modelling from data noticeable odour extending for 250 m to 350 m.
- Field survey confirmed sampling - odour detected for maximum of 350 m from the spreading operations