Biosolids Master Plan
Stakeholder Advisory Committee
Meeting #3

December 5, 2013

Winnipeg

Meeting Outline

- Review of remaining three options
  - land application
  - thermal oxidation
  - pelletization
- Trade mission recap
- Principles and criteria

Winnipeg

Land Application

- Biosolids hauled to agricultural or forested land and used as fertilizer

Winnipeg

Land Application Process

- Liquid biosolids land application
  - injected into soil (94 - 97% water)
  - requires lagoons for storage
  - lagoons widely known to cause odour problems
- Wet cake biosolids land application
  - dewatered and applied to agricultural land

Winnipeg

Land Application Regulatory Requirements

- Must comply with Manitoba regulations
  - volume limits for residual phosphorous and nitrogen, based on site specific soil tests
  - spreading restrictions within defined nutrient buffer zones
  - seasonal spreading restrictions (not from November 10 to April 10)
  - file an acceptable Nutrient Management Plan

Winnipeg

Land Application Stakeholders

- Regulators (Manitoba Conservation)
- City of Winnipeg
- Agricultural sector
  (e.g., grain farmers, sod farmers)
- Rural municipalities where biosolids applied
  - includes residents in the vicinity of land spreading
- Contractors can provide the necessary hauling and land application equipment

Winnipeg

Land Application Elsewhere

- Most common practice in western Canada (about 80%)
  - Calgary (currently being phased out)
  - Edmonton
- Less common in eastern Canada (range from about 25% - 40% depending on Province)
  - Toronto, Ottawa
- USA (about 70%)
- Europe
  - most common in France and the UK (65 - 70%)
  - much less common in Germany and Northern Europe

Winnipeg

Land Application
Key Success Factors

- Comply with regulatory requirements
- Provide benefit to farmers
- Ensure viable haul distances (i.e., cost and carbon footprint)
- Acceptable to RM's in which undertaken
  - minimize nuisance to area residents (e.g., odour)
- Ongoing communication with stakeholders
- Ensure low metals content

Winnipeg

Land Application

Advantages

- Beneficial reuse
- Utilize nutrients

Disadvantages

- Seasonal spreading restrictions
- Must ensure quality of biosolids
- Land suitability
- Requires storage
- Weather and soil dependent
- Odours
- Cost ($$)

Winnipeg

Thermal Oxidation

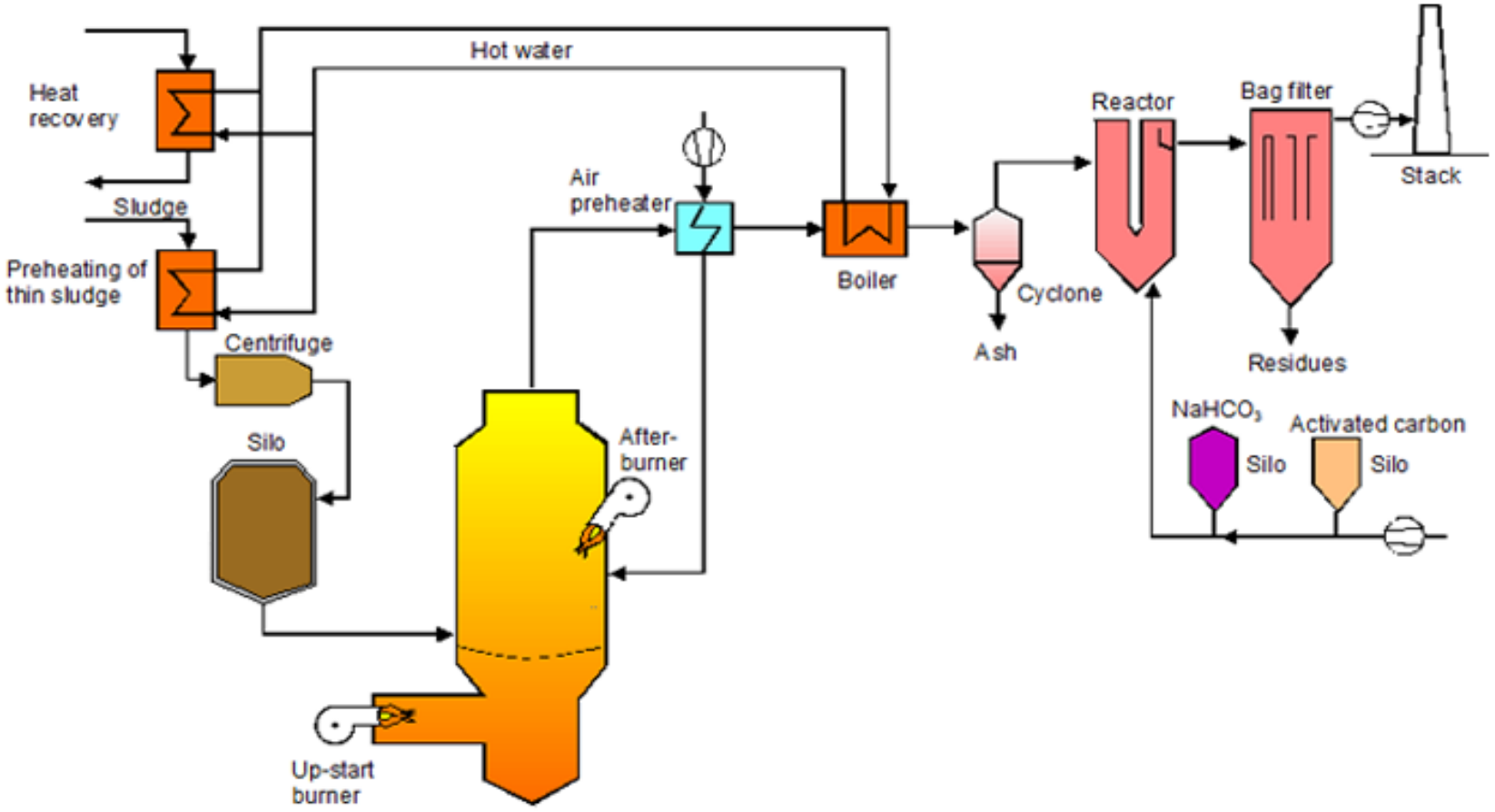
- Biosolids are burned to produce heat and energy

Thermal Oxidation Process

- Biosolids are dried and then burned, leaving only ash
- Exhaust air treated to meet air quality requirements
- Energy recovery
- Ash disposal methods:
  - reuse (e.g., filler in cement and brick manufacturing, sub-base for road construction, footings at athletic facilities)
  - landfill cover (requires further study)
- Footprint is about 1/7 of a football field

Winnipeg

Thermal Oxidation System



Winnipeg

Thermal Oxidation Stakeholders

- City of Winnipeg
- Regulators (including air quality emissions)
- Manitoba Hydro (energy recovery)
- End user of ash

Winnipeg

Thermal Oxidation Elsewhere

- Eastern Canada
  - Quebec – 42%
  - Ontario – 20% (including Toronto)
- USA
  - 20% (including Minneapolis)
- Europe
  - France, Germany, Northern Europe
  - all include energy recovery

Winnipeg

Thermal Oxidation
Key Success Factors

- Energy recovery for sustainable reuse
- Suitable end use for ash
- Meet regulatory requirements for air emissions
- Suitable location

Winnipeg

Thermal Oxidation

Advantages

- Sustainable reuse with energy recovery
- Greatest volume reduction
- Ash is reusable
- Minimal storage and handling requirements
- Smallest footprint required

Disadvantages

- Cost ($$)
- Requirements for air quality treatment and monitoring
- Low energy rates

Winnipeg

Pelletization

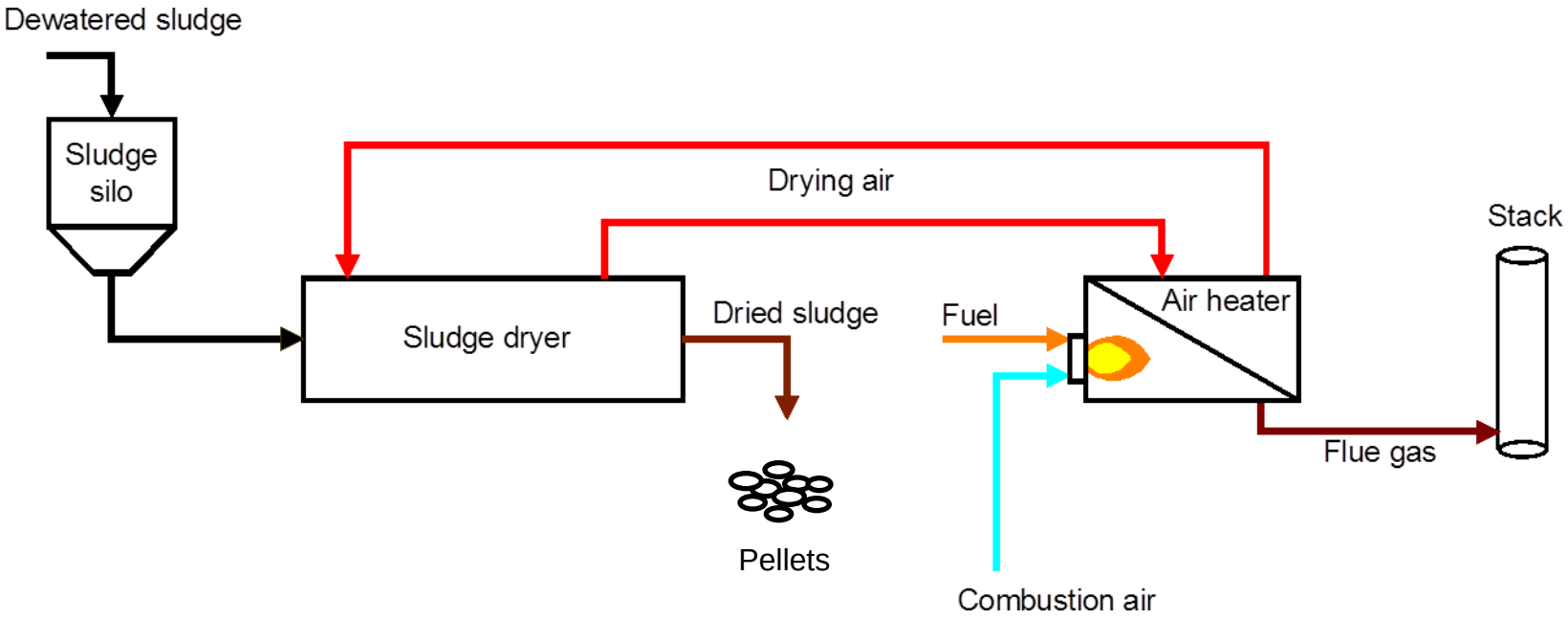
- Pellets used as biofuel or fertilizer

Pelletization Process

- Biosolids are dried to form pellets
- Can be directly applied to agricultural fields, lawns
- Can be mixed with other ingredients to create a fertilizer
- Footprint is about 1/3 of a football field

Winnipeg

How Pellets are Made



Winnipeg

Pelletization Stakeholders

- Regulator(s)
- City of Winnipeg
- Private sector (e.g., product distribution, fertilizer manufacturers)
- Residents near pelletizing facility (nuisance odours)

Winnipeg

Pelletization Elsewhere

- Canada - at least 8 facilities (Toronto the largest)
- USA - at least 14 facilities
- Europe
  - more common in smaller cities
  - used mostly for fuel in thermal oxidation plants with energy recovery
  - includes Poland, Italy, Netherlands, Germany, Norway

Winnipeg

Pelletization Key Success Factors

- Requires a sustainable market for pellet
- Used where other options are expensive or not feasible (e.g., landfilling, thermal oxidation, land application)
- Odour control strategy

Winnipeg

Pelletization

Advantages

- Lower volume of material
- Generates a marketable product
- Potential for using anaerobic digester gas for fuel
- Relatively small footprint

Disadvantages

- Decreasing demand for pellets
- Cost ($$)
- Dust is hazardous (e.g., health, explosive)
- Odours

Winnipeg

QUESTIONS?

Winnipeg

Principles and criteria

Winnipeg