Co-Firing Sewage Sludge, Biomass and Municipal Waste

Co-Combustion of Sewage Sludge with Non-Solid-Waste Fuels *(Emissions Issues)*

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Biosolids as an Energy Source

- Abundant, reliable, carbon-neutral, and renewable source of energy
- 16,500 WWTPs nationwide generate 8 MM dry tons annually, or approximately 1.25 x 10^{14} Btu of potential energy, enough to power ~1,000,000 homes if harnessed
- Strong, successful track record in US and Europe
- Currently accepted by some states as part of their Renewable Portfolio Standards programs

The Problem…

- Sewage sludge is defined by EPA as a solid waste, the combustion of which is governed under Section 129 of the CAA for purposes of emissions control, while;
- Conventional fueled boilers are governed under Section 112, with less stringent emissions standards
- When sewage sludge is co-combusted with a non-solid waste fuel (i.e., coal, biomass, etc.), emissions standards shift to 129 rather than 112
- This can place an added capital burden on many projects

Emissions Standards

- Section 129 (incinerators) requires MACT standards for Cadmium; CO; Dioxins/Furans; HCl; Lead; Mercury; NO_x; SO_x; and Particulate Matter
- Section 112 (boilers / process heaters) requires:
  - MACT for major sources (if annual emissions exceed 10 tons for any one toxic pollutant or 25 tons in total)
  - GACT for non-major sources (plus MACT for Mercury)

40 CFR §241.3 - Solid Waste Definition

- Non Hazardous Secondary Materials Rule
  - Determines which NHSMs are solid waste and which are not when burned in a combustion unit
    - Dictates what emissions limits apply, CAA Section 129 or 112
    - Presumes biosolids to be solid waste
  - Solid waste materials subject to CAA Section 129 emissions limits
  - Non-solid waste materials subject to less stringent CAA Section 112

40 CFR §241.3 - Solid Waste Definition

- NHSM burned in a combustion unit will be considered as Solid Waste unless:
  - The material is used as a fuel and remains within the control of the generator (on or off site) and meets the legitimacy criteria;
  - The material has been sufficiently processed to produce a fuel that meets the legitimacy criteria;
  - Is determined, through a case by case petitioning process, to be a non-solid waste fuel product

EPA Petitioning Process

- EPA Regional Administrator may grant a non-waste determination for a NHSM used as a fuel if:
  - NHSM has been processed as per 40 CFR Part 241.2
    - EPA determined that heat-drying in conjunction with source control and WWTP processing (grit/rag removal, anaerobic digestion, dewatering, etc.) qualifies as processing
  - NHSM meets "Legitimacy Criteria" as per 40 CFR Part 241.3
- Applies to materials no longer under the control of the generator

EPA – Legitimacy Criteria

- NHSM must:
  - Be managed as a valuable commodity
  - Have a meaningful heating value (≥ 5,000 Btu/lb) as combusted
  - Be used as a fuel in a combustion unit that recovers energy
  - Contain contaminants in quantities comparable or lower than those contained in the fuel the unit was designed to burn
    - *EPA published "Contaminant Concentrations in Traditional Fuels: Tables for Comparison, November 29, 2011" as a guide to help compare contaminant levels*

Contaminant Concentrations in Traditional Fuels: Tables for Comparison, November 29, 2011

- Compares to Traditional Fuels:
  - Antimony
  - Arsenic
  - Beryllium
  - Cadmium
  - Chromium
  - Cobalt
  - Lead
  - Manganese
  - Mercurcy
  - Nickel
  - Selenium
  - Chlorine
  - Fluorine
  - Nitrogen
  - Sulfur

EPA – Legitimacy Criteria

- Other EPA Considerations re: Whether NHSM Is Being Managed as a Valuable Commodity
  - Market participants treat NHSM as a product and not discarded solid waste
  - Identity of NHSM is comparable to commercial fuels
  - The NHSM will be used within a reasonable time
  - The NHSM is managed in a similar manner to analogous (co-combusted or displaced) fuels
  - The NHSM contributes positively to the process

The Good News…..

- Although criteria #4 re: contaminant levels was expected to be the toughest to meet, successful petitions have already been documented:
  - Delhi Charter Township, MI
  - DTEES Detroit, MI
- Both compare biosolids to coal
- No known petition process has been initiated comparing biosolids to fuel oil or wood/biomass
- The question is still being argued in court and could again change, but for now the petition process provides a positive approach to the issue

Summary

- Although tightened air emissions standards may challenge projects involving co-combustion of sewage sludge with non solid waste materials (i.e., conventional fuels or biomass), a process exists by which EPA may grant a non-waste determination for a sludge-fueled project
- The process has been successfully tested and found to be effective
- The Solid Waste definition rules should not solely preclude a project from moving forward
- Finally note that in many cases, facilities already comply with 129 standards vs. 112 and as such, can co-combust solid waste and non-solid waste with little financial impact

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Thank You