Waste Conversion Technologies Emissions Testing and Modeling

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Presentation

- The Setting – Why is an APCD Doing This?
- Essential Question: IS IT SAFE?
- Selected Waste Conversion Technologies
- Source Testing Program
  - Pollutants of Concern
  - Feedstock Characterization and Transportation
  - APCD's Role, and other entities involved
- Health Risk Modeling
- Project Schedule
- Summary

The Setting: Why Are We Here?

- County's Tajiguas L/F has limited capacity
- Recent license extension
  - Politically bruising exercise
  - 2018? 2020?
- Other alternatives ...
  - New Landfill to serve South Coast Region
  - Additional Expansion of Tajiguas
  - Shipment (Rail? Truck?) out of the County

...are unattractive

With Few Long-term Options...

- Conversion May Be a Reasonable Alternative
- Decrease Volumetric Input to Existing L/F
  - Reduce, Re-use, Recycle Programs in place & improving (ambitious and effective)
  - After R/R/R, use Conversion Technology to decrease volume of waste going to L/F *and* extract energy
- Four-year process to identify & screen available technologies & vendors
- Gasification, Acid Hydrolysis & Anaer. Digestion

Essential Question: Is It Safe?

- Many assertions of safety & low emissions
- Lack of credible scientific data
- APCD's proposal to test conversion technologies
- IWMB grant: $400K supporting testing
- Team: IWMB, County, OEHHA, ARB, consultants
- Essential question of emissions testing program

  "Can conversion facilities be safe?"
- Answer with scientific rigor & objectivity

Technologies to be Tested

- Acid Hydrolysis
  - Ethanol and mulch are primary products
- Gasification to produce ...
  - Synthesis Gas
  - Ethanol
- Residual materials go to landfill

Feedstock Characterization

- Santa Barbara County solid waste
- "Stoop & Pick" to characterize
- Transport to Materials Recovery Facility
  - Assess recovered material not included in feedstock
  - Remainder is CT feedstock to be processed
- Transport est. 40-100 tons to each facility

Transportation Issues

- Unavoidable delays (e.g., MRF availability, distance to facility, facility upsets)
- Physical, chemical and biological changes may occur from time of waste collection to time of feedstock processing
- Assumption: Emissions from “fresh” MSW are the same as week-old MSW

Emissions Testing Program

- "Criteria" Pollutants (NOx, SOx, PM, ROC, CO)
- Toxic Air Pollutants
  - Polycyclic Aromatic Hydrocarbons (PAHs)
  - Chlorinated Compounds, including:
    - Dioxins, Furans, PCBs, Vinyl Chloride
  - Metals (Cr^{+6}, As, Pb, Hg, Cd, ...)
  - Aldehydes (acrolein, formaldehyde, acetylaldehyde)
  - Acid gases (HCl, HF)
  - Speciated Volatile Organic Compounds
    - Benzene & relatives, hexane, propylene, others

Emissions Testing – cont.

- CT vendors pay testing & related costs
- APCD controls test plans and emissions reports
- All tests based on ARB, EPA methods
- APCD observes emissions testing & interacts with analytical labs
- Emissions testing contractor provides report directly to APCD

Testing Results

- Emission data will be in presented in lb/hr, lb/ton of waste processed, and in concentration (ppm)
- Scale up emissions results by each CT's expected operational level in Santa Barbara County
- Use scaled results in Health Risk Assessment model (HotSpots Analysis & Reporting Program)

Health Risk Assessment

- Facility Risk Modeling (HARP)
  - Considers emissions & facility characteristics, meteorology, terrain and pollutant potency
  - Assumptions: facility location (met data and terrain dependent), scale facility size
- Risk Assessment to be performed by APCD
- Draft to be reviewed by OEHHA

Health Risk Assessment – cont.

- Three values describe health risk
  - Cancer risk
  - Acute Non-cancer risk
  - Chronic Non-cancer risk
- Assessment creates three risk footprints
  - Depict modeled risk impacts on and off site.

Example HRA Output

Final Report

- Final report to Waste Board to include...
  - Description of types of CT facilities tested
  - Testing plan and report for each CT facility
  - Comparison of emissions to regulatory standards
  - Risk Assessment for each CT facility
- **Answer to essential question: "Is it safe?"**

Working Schedule

- Preparatory work now underway
- Source testing targeted for Fall, 2006
- Risk Assessment work in Summer, 2007
- Final Report in Fall, 2007

Summary

- The Setting – Why is an APCD Doing This?
- Essential Question: *Is It Safe ?*
- Evaluating Acid Hydrolysis and Gasification
- Source Testing Program
  - Pollutants of Concern
  - Feedstock Characterization and Transportation
  - APCD's Oversight Role – Scientific Rigor, Objectivity
- Health Risk Modeling
- Project Schedule

End