

Air Quality Permitting Waste-to-Fuels Projects

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Yorke Permitting Experience

- Landfill Gas-to-Power
- Waste Organic Liquids-to-Ethanol Fuel Processing
- Sewage Digester Gas-to-Power
- Wood Waste-to-Power
- Onion Waste-to-Power
- New, Emerging Technologies, e.g., Pyrolysis



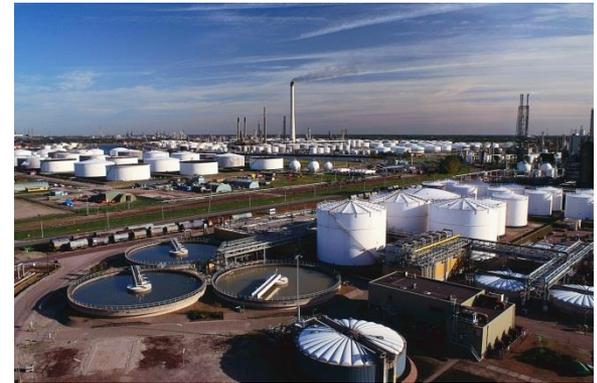
The Keys to AQ Permitting

- What Are the Critical Requirements to Tackle?
- Resolving the Issues
- Case Studies



Permitting Basics

- To Permit New Equipment in Non-Attainment Areas, Consider:
 - Type of Emissions – VOCs, NO_x, SO_x, toxics, etc. (stack and fugitive);
 - Compliance with Existing Rules/Regulations; and
 - New Source Review – the Federal Standards for New Equipment



Compliance with Existing Rules and Regulations

- New or Modified Equipment must meet:
 - Local Air District Rules and Regulations;
 - Air Toxic Health Risk Requirements; and
 - Federal Standards (NESHAPs and NSPS)
- New Source Review requires:
 - Best Available Control Technology (BACT) or Lowest Achievable Emission Rate (LAER);
 - Offsets for the New Air Emissions; and
 - Air Quality Impact Demonstration (Modeling)

Each Region Is Classified for AQ

■ NSR Applies to Non-Attainment Pollutants, Depending on Location:

- Ozone (NO_x , VOCs)
- NO_x
- SO_x
- CO
- PM_{10}
- $\text{PM}_{2.5}$

Location and Pollutants Matter...

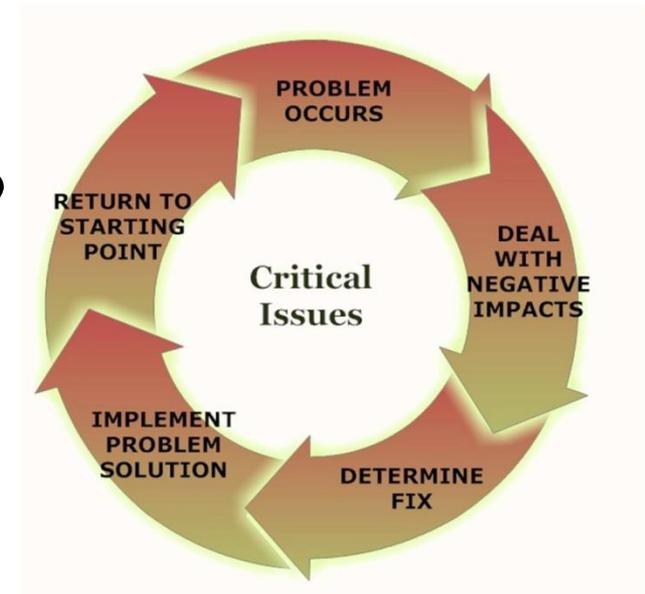


Emissions Controls

- Most large projects will require BACT or LAER
- For example:
 - For NO_x – Selective Catalytic Reduction (including gas cleanup, if needed)
 - For VOCs – Regenerative Thermal Oxidizer (RTO)
 - For Organic Toxics – RTO or Catalytic Oxidation
 - For Particulates (including metals) – Baghouse

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Plan and Design for AQ Issues

- Identify the Federal, State, and Local Requirements up front
- Quantify the projected pollutants and emissions, including fugitives, toxics, and odorous compounds
- Identify the Lowest Emissions Technology and get guarantees
- Build compliance into the project and be prepared for Public Notice

Before Submitting an Application

- Ensure that compliance with all requirements is incorporated in the design;
- Provide only accurate data and information in the application;
- Present basis of emissions data clearly – e.g., guaranteed, estimated, etc.; and
- Be prepared to adjust the design based on agency inputs

Beware!

- Wait for the Permit to Construct before purchasing equipment or starting construction;
- Don't over-promise performance or underestimate potential emissions – these may become permit limits/conditions; and
- Work with agencies carefully on permit conditions – understand the requirements!

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Orange County Landfill

- Orange County Waste & Recycling
- Combined-Cycle Biogas Technology
 - Landfill Gas
 - 32 MW Electricity Generation (Renewable PPA)
- Equipment Description
 - LFG Pre-Treatment System with Regenerative Flare
 - Four (4) SolarTurbine Generators
 - 4-on-1 Steam Drum and Turbine
- Oxidation Catalyst; SCR



MSW Anaerobic Digestion

- Air Permitting Agency: SCAQMD
- Anaerobic Digestion of Greenwaste
 - “Digestate” Composted for Soil Amendment
 - Renewable CNG for Waste Collection Trucks
- Permitted Equipment Includes:
 - Digesters
 - Gas Purification Equipment
 - Flare
 - Biofilter



Hyperion Treatment Plant Digester Gas Utilization Project

- City of Los Angeles
- Process Description
 - Digester Gas and Natural Gas
 - Electricity with Cogeneration of Heat
- What Is Permitted
 - Fuel Gas Treatment System
 - Combustion Turbine Generators (3)
 - Thermal Oxidizers
 - Black-Start Generator
- Control Device
 - Selective Catalytic Reduction System
 - Oxidation Catalyst



Delta Diablo Sanitation District East County Bioenergy Project

- BAAQMD Alternative Technology Review and Permitting Feasibility Study
- Potential Fuels = 64 TPD Biosolids, Wood Waste, and Food Waste
- Permitting Issues
 - Gasification \neq Combustion (or Incineration)
 - Few Operating Installations, So Limited Data
 - Syngas (from Gasifier) Is Different Than NG or Landfill Gas
 - BACT Needed for NO_x , SO_x , and PM

Conclusion – Permitting Can Be Done!

- Despite having to overcome regulatory requirements, air quality permitting for projects is possible
- Waste-to-energy projects can be advantageous in both environmental and monetary terms
- In 2009, an onion processing facility expected its \$9.5 million system to pay for itself within 6 years, while eliminating 30,000 tons of carbon dioxide-equivalent emissions a year

Win-Win!