Cement-Lock

Integrated, Sustainable, Cost Effective Solution for the Permanent Destruction of the Toxicity of Contaminated Sediments

Volcano Partners LLC

VP LLC

Overview of Cement Lock® Technology

- Thermo-chemical manufacturing process.
- Slagging Non-Pollutant Rotary Kiln.
- Designed to produce Ecomelt®, a cement admixture, and Electricity.
- Clean natural gas/biogas for fuel.
- Patented, demonstrated technology.

Technical Acceptance

National Advisory Council for Environmental Policy and Technology (NACEPT):

"Cement-Lock is a virtually odorless thermal-chemical technology that converts contaminated sediment and hazardous waste to Ecomelt®, a non-leachable, harmless beneficial-use product. When combined with cement it exceeds the ASTM requirements for Portland cement and concrete."

Passaic River Coalition:

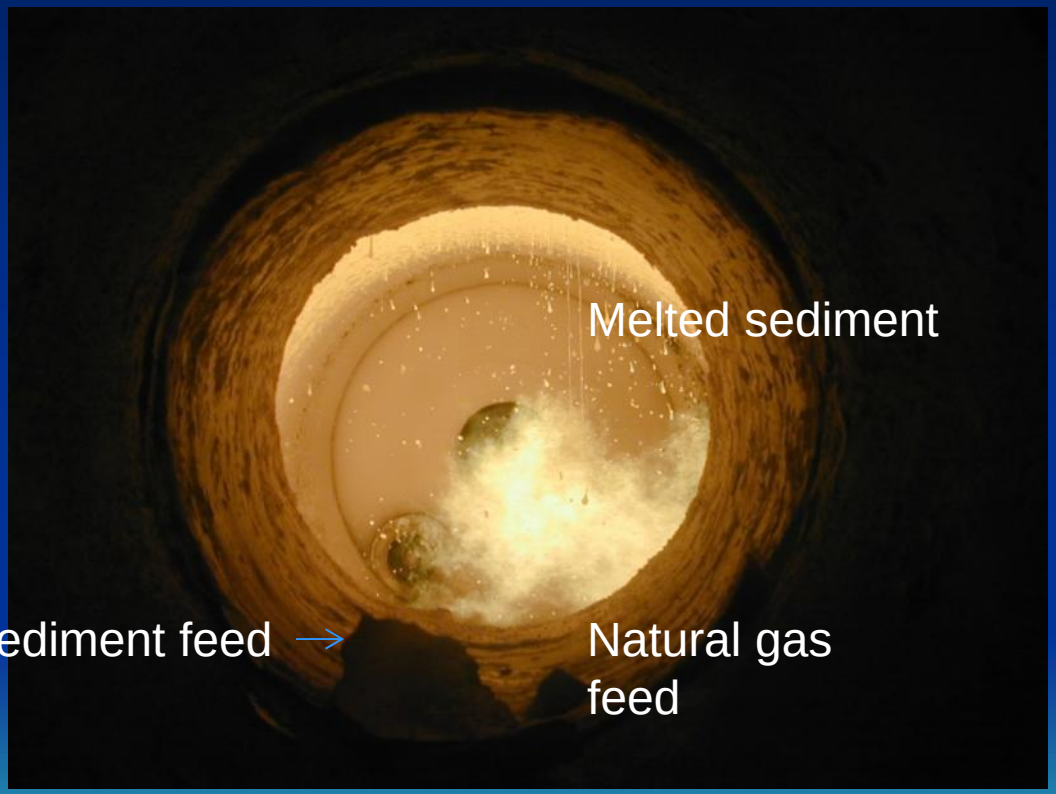
"Today the appropriate technology for managing these sediments, Cement-Lock®, is available…"

- **Anne L. Kruger, Ph.D., Technical Advisor, Diamond Alkali Superfund Site**
- **Ella F. Filippone, Executive Administrator**
- **Michael Reinhart, Environmental Specialist**

U.S. EPA

Option "C" for the proposed plan for the clean up of the Lower 8 Miles of the Lower Passaic River

Ecomelt Manufacturing Process



Ecomelt Replaces 30-40% of Portland Cement in Concrete

Milled Ecomelt

ASTM Tested

Montclair State Pour

- Ecomelt passes U.S. EPA TCLP Leaching Testing
- Ecomelt passes ASTM Strength, Flex, and Compression Testing
- NJDEP “Acceptable Use Determination” for pilot program
- Letter of Intent with US Concrete
- Initiated NJDOT approval process

Treated Manufactured Soil / Construction-grade Cement: Montclair State University

30-40% replacement for Portland cement

Electricity Generated for Beneficial Use and Sustainability Measures

- Capture excess heat
- Heats Boiler
- Steam runs turbine
- Electrical power for plant & export*

*1MW to 10MW Based on Plant Scale

NJDOT/EPA/BNL DoE
Full Scale Operations

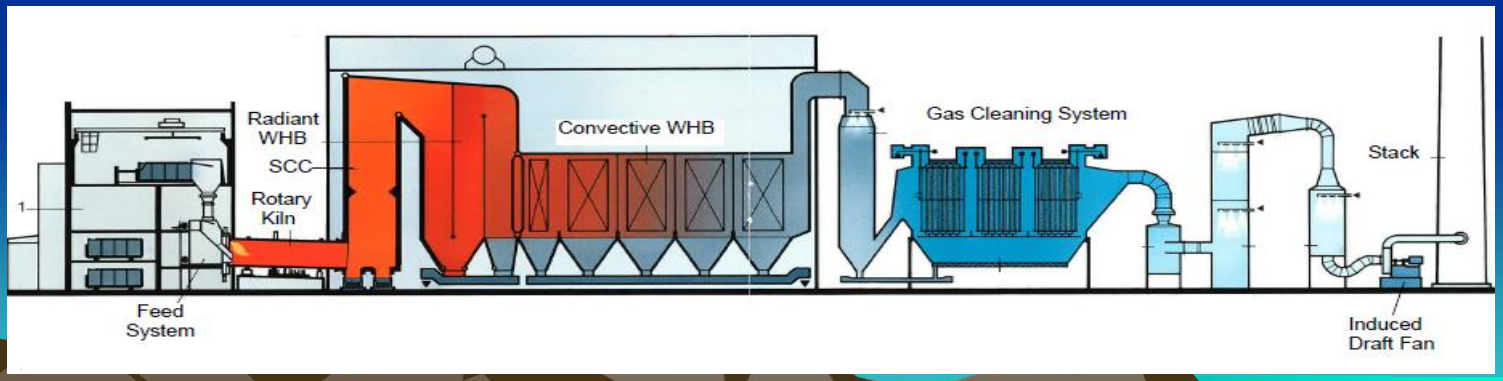
Design and Process

2008

Bayonne, New Jersey

Foster Wheeler Design 2015
(9 Rotary Kilns in Operation in US)

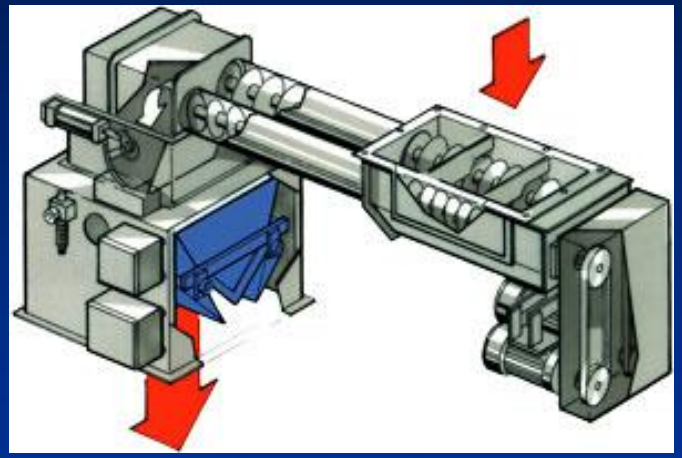
Aragonite (Tooele County), Utah



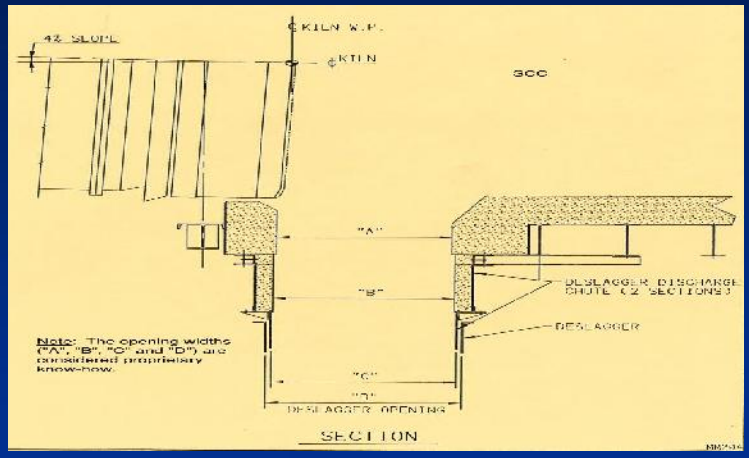
Cement Lock Foster Wheeler Manufacturing Design

Foster Wheeler 2015 Engineering Design Enhancements

1. Filter Cake Charging System



2. Drop-Out Box System



3. Lead APC Enhancements

4. Mercury APC Enhancements

Options for Urban Plant Wrap Design and Aesthetics

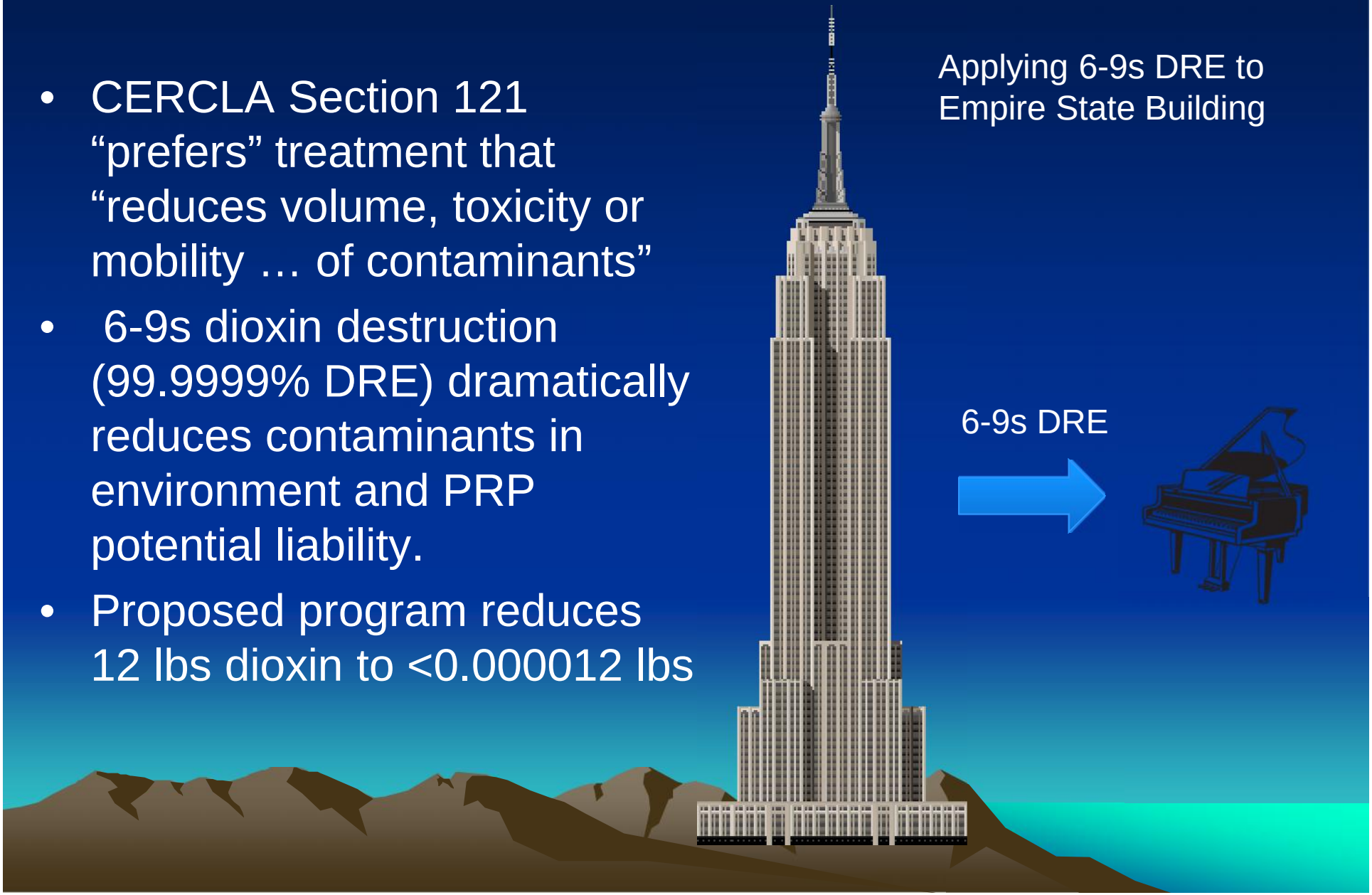
WTE Kiln in North Hykeham UK

Integrated Environmental Manufacturing

- Precision Dredging/Minimize Resuspension
- Dewatering/Silt/Clay/Sand Fractions Removal/Reuse/Volume Reduction
- Cement Lock Processing/Ecomelt Manufacturing/Beneficial Use
- Ecomelt/Portland Cement Blend to Stabilize and Dry Sediments for Upland Placement

CERCLA Section 121 Prefers Treatment

- CERCLA Section 121 "prefers" treatment that "reduces volume, toxicity or mobility … of contaminants"
- 6-9s dioxin destruction (99.9999% DRE) dramatically reduces contaminants in environment and PRP potential liability.
- Proposed program reduces 12 lbs dioxin to <0.000012 lbs

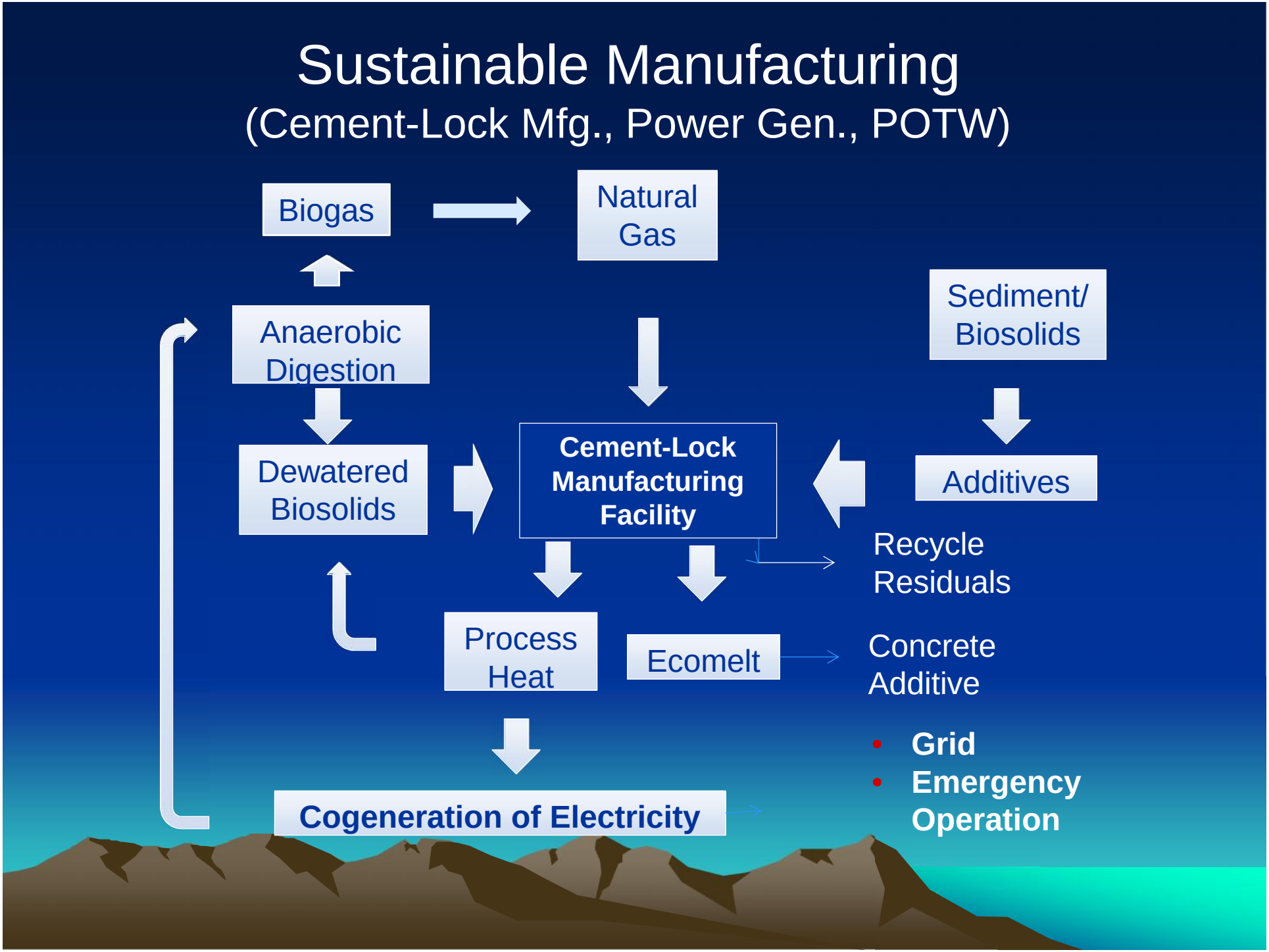


Mercury APC Enhancements

- State of the Art (“SOTA”) mercury air pollution controls (“APC”).
- Continuous emissions monitoring (CEMs)
- An additional mercury removal phase through the injection of powdered activated carbon ahead of the baghouse.
- Maintain packed bed carbon adsorber.
- 99% or greater removal rate.

Sustainable Manufacturing

(Cement-Lock Mfg., Power Gen., POTW)



Sustainable Materials Management

- Runs on natural gas/biogas and electricity from cogeneration
- Replaces mining and transport of raw materials for cement production
- Each ton of Ecomelt produced eliminates 1 ton CO_2 by cement manufacturing industry
- Sharply reduces GHG emissions for long distance transport
- Local jobs and revenues
- **Reduces Contaminant Mass and Eliminates Long-term Liability**

NY/NJ Watershed
The Regional [Urban] Sediment Management Perfect Storm*

Regional (Urban) Sediment Management

The Perfect Storm:

2012 - 2022

Remediation / Restoration +

USACE Navigation dredging with placement (non- ocean placement material)

*Eric Stern, Battelle, May 13, 2013 Environmental Law Conference Presentation

Cement-Lock® Facility Creates Regional Jobs and Economic Development

2014	2015	2016	2017	2018	2019-Beyond
Construction Phase		Operation Phase			
100 FTEs per year		400 Direct FTEs per year 2500 Indirect FTEs per year			

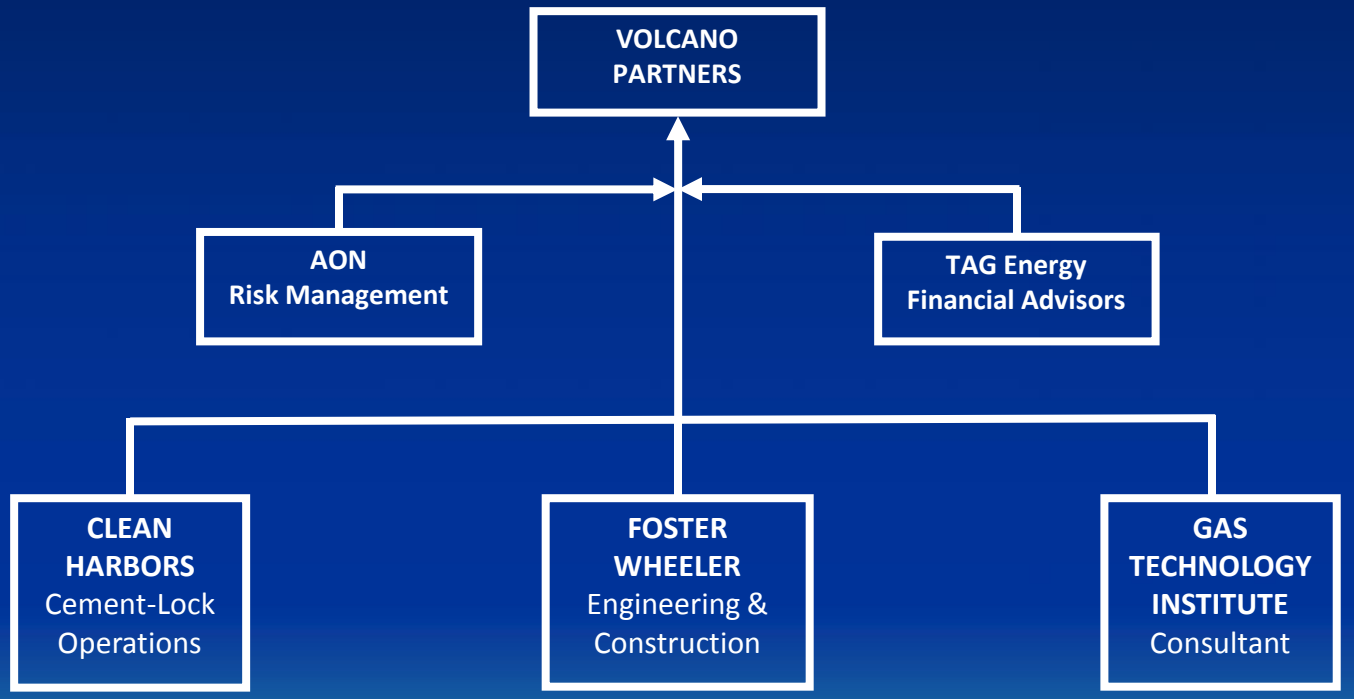
Example of Riverfront Project:

<u>Anacostia River in Washington D.C</u>

2012 CRID Report projects (20 years):

- $2.28 billion in tax revenue
- 21,000 permanent jobs
- 585 construction jobs each year

Plant Development and Operation Team Members



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