Geocycle & Waste Co-Processing in Cement Kilns

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Agenda

- Waste situation in Vietnam
- Introduction to Holcim Vietnam and Cement Kiln waste operations.
- Logistical aspects of waste transportation
Vietnam current hazardous waste situation and future direction.

- Vietnam is currently generating 500~1,000,000 tons of hazardous waste per year, but only has in place proper treatment options for a fraction of that.
- The treatment options available are: Landfill, small incinerators, cement kiln.
- So far Holcim is one of the few cement companies to offer a waste treatment solution, we expect that more will do so in the future, especially in the north.
- There are no international standard hazardous waste engineered landfills available in the south of Vietnam.
- Several large international standard incinerators have been announced in the media, however none have yet been constructed and generally they are focusing on municipal (household) waste.
- Some other waste treatment solutions based on experimental technologies have been announced but not yet constructed.
Medical and municipal waste are often cited by the Government as the most urgent waste challenges facing the country.

There are some investment incentives related to waste management, but these relate to Municipal (City) waste and not industrial waste.

The government’s options on hazardous waste are limited, and so moving forward, the solutions will most likely be based on landfilling, incinerators and in the future also widespread use of cement kilns.

Generally speaking, no CDM opportunities available to industrial waste generators with the exception of electricity generation (eg by capturing landfill gases).
Waste Regulations in Vietnam

- The main current regulation relating to hazardous waste in Vietnam is Circular No 12/2011/TT-BTNMT (effective date 1st June 2011): Regulations on management of hazardous waste, Ministry of natural resources and environment.

- Key responsibilities of the Waste generator:
  - Must try to minimize hazardous waste generated, ensure that there is proper storage of the waste.
  - Must send the waste to a licensed waste treatment company.
  - Waste Registration book, (issued by the dept of environment) if the waste quantity is greater than 120kg or 600kg per year depending on the waste.
  - Waste manifest (multiple copies) for all waste that is collected.
  - Waste must be segregated (no mixing of waste) and must be stored safely.

- Dept of Environment in each province may also have issued some regulations on hazardous waste for their province. Should ensure that you familiarize yourself with the provincial regulations.
Characteristics of Waste Management

- Waste Management is one of the only industries where the money (fees) and the goods (the waste) both go to the vendor.
- After the transaction the vendor walks away with the money and a quantity of waste which they must now spend some of that money to treat properly.
- At the other side of the transaction the waste generator (the customer) walks away with less money, but with the satisfaction that their waste will be treated properly (hopefully !!).
Ho Chi Minh City

Môi trường Đô Thị (Citenco): Dumping 40 tons of pesticide contaminated sludge in Dong Thanh landfill (27/09/2011)
Sonadezi What does Sonadezi do with 5.316 tons of hazardous waste?
**Binh Duong Province**

XN Xu Ly Chat thai Binh Duong _Dumping 5,000 tons of milk powder_

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**Tien Giang Province**

Sao Mai Xanh _Dumping of untreated waste at the factories_

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About Holcim Worldwide

- Founded in 1912 in Holderbank, Switzerland
- With majority and minority interests in more than 70 countries on all continents, Holcim is one of the world's leading suppliers of cement, as well as aggregates (gravel and sand), concrete and construction-related services
- Employees: 83,000+
- Cement production capacity: 211 Mil tons
- Aggregates sold in 2010: 188 Mil tons
- Concrete sold in 2010: 45 cubic meters
- Net sales 2010: 20.8 billion USD
Holcim Vietnam

- Holcim in Vietnam since 1996.
- Operating at manufacturing sites in Vietnam:
  - Kien Giang, Hon Chong
  - HCMC: Cat Lal, Hiep Phuoc
  - Vung Tau: Ba Ria
- Total Invested Capital: $485 million
- Total Employees: 1,600
- Sell in the South of Vietnam only (~25% market share).
Sustainable Development (SD) is embedded in our strategy

**Vision**
Our vision is to provide foundations for society's future.

**Mission**
Our mission is to be the world's most respected and attractive company in our industry – creating value for all our stakeholders.

- Member of World Business Council for Sustainable Development (WBCSD)
- Named “Leader of the Industry” in the Dow Jones Sustainability Index 2009/10 for four years
- Selected as an index component for the Dow Jones Sustainability World Index and the European Dow Jones STOXX Sustainability Index
Cement Kiln Co-processing

- In order to make clinker (cement intermediate product) extremely high temperatures are required (1,450°C).
- The high temperatures reached in a cement kiln and a controlled process allows a cement plant make environmentally efficient use of waste products and therefore to play a major role in waste management.
- Thus the concept of co-processing is born. One industry using the waste from another industry to make its products.
Use of Waste in Cement Kilns is already quite common in many countries

% Substitution of Waste in cement kilns [selected countries 2002-4]

- USA
- France
- Germany
- Norway
- Switzerland

Acid tar deposit
Landfilling
Industrial wastes
Hydrocarbon sludge’s
Plastic’s mixtures
Used tires
Geocycle is the global waste management brand of Holcim

Geo means “earth” in Greek, while Cycle calls to mind the cycle of life. “Geocycle” refers to our ability to convert waste into a safe, useable resource.
Holcim’s Global Waste Co-processing Network 2010

- Co-processing activities in 40 countries with over 4500 customers
- More than 7 mil. tons of processed waste co-processed in 2009
- Treated about 20,000 waste streams
Advantages of a Cement Kiln as a solution for Waste:

- No Ash, all materials retained in clinker
- High temperatures (gas temp > 1800°C)
- Alkaline environment
- Long residence time (gas ~10 sec, solids 30 min)
- Oxidizing atmosphere
- High thermal inertia
- Self cleaning process (CaO)
- Continuous emission monitoring equipment (installed at all Holcim plants)

Concrete made from cement manufactured using alternative fuels has the same construction and environmental properties as concrete made from cement manufactured using fossil fuels.
Typical wastes co-processed in cement kilns

- Waste water sludges/filter cakes
- Expired FMCG
- Expired food/health products
- Packaging materials
- Plastics
- Rubber wastes
- Textile waste
- Refinery wastes
- Expired seed
- Damaged goods
- Manufacturing waste
- Paint wastes
- Used oil & grease
- Pesticides/crop protection products.
- Contaminated soils
- Scrap tires
- Wood chips
- Solvents
- Carbon fines
- Oil filter fluffs
- Shipping wastes
- Sorted municipal solid waste

Holcim Vietnam/Geocycle is currently co-processing ~3,000 tons of industrial waste per month
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The Geocycle Vietnam

CAMBODIA

Phnom Penh

HON CHONG PLANT
1.4 mio t/a
OPC Bulk Cement

Rach Gia

Can Tho

Bulk Cement
1.4 mio t/a

Ho Chi Minh city

Vung Tau

Pozzolana 0.4 mio t/a

CAT LAI CEMENT TERMINAL
1.8 mio t/a
PB C cement

VUNG TAU CEMENT TERMINAL

HIEP PHUOC CEMENT TERMINAL

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Geocycle Vietnam Supply Chain

Industrial Customer

Regular Collection

Cat Lai

Testing

The kiln

Transport to Hon Chong
Waste transported to Hon Chong by Holcim’s cement ship
Barge transportation
Waste transportation

- Management of hazardous wastes is heavily regulated:
  - Waste management license,
  - All vehicles/barges to have special permits.
  - 50% of road fleet must be owned by waste management company
  - All staff must have special training
  - Specialized equipment/PPE.
  - GPS tracking of trucks.
Thank You

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Because tomorrow matters
No Impacts on emissions when co-processing waste
World views of Co-processing of Hazardous Waste in cement kilns

“The environmental performance of thermal treatment of specified wastes in cement kilns is better compared to thermal treatment in waste incinerators for the majority of environmental impact categories considered.”

Source: Environmental Benefit of Using Alternative Fuels in Cement Production-A Life Cycle Approach, CEMBUREAU