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CONFERENCE & EXHIBITION

Treatment by co-processing in cement kilns
of (obsolete) pesticides
A local solution for a international problem

Ed Verhamme – Managing Partner

Alternate Resource Partners



CONTENT OF PRESENTATION

- ❖ Introduction Alternate Resource Partners
- ❖ Treatment pesticides in cement kilns
- ❖ Advantages & test results of treatment of pesticides by co-processing in cement kilns
- ❖ International development & recognition cement kin solution
- ❖ Support FAO-UN & UNEP
- ❖ Observations on way forward
- ❖ Take home messages



Introduction Alternate Resource Partners (ARP) I

- Company started in 2009
- Network of Consultants, engineers, trainers, coaches & field operators for resource/waste management and cement manufacturing
- Worldwide experience in both mature and emerging countries replacing all fossil fuels by “waste - to – AFR” as well as POP’s handling
- ARP & its partners have > 200 years experience in all aspects of resource & waste management and cement manufacturing when it comes to AFR



Introduction Alternate Resource Partners (ARP) II

Main activities ARP:

- ✓ Resource management business development in cement, lime & electric power industry,
- ✓ Waste-to-AFR market research, feasibility studies, etc.,
- ✓ Marketing & Sales training & coaching,
- ✓ Technical & Commercial support pre processing activities
- ✓ Consulting, reviews & audits on health, safety & environmental behaviour,
- ✓ HAZOP Studies on waste/AFR Installations
- ✓ Support POP's handling & pre-/co-processing
- ✓ Development specialized recycling machines for waste-to-AFR activities,
example: oil - filter recycling machine for emerging countries



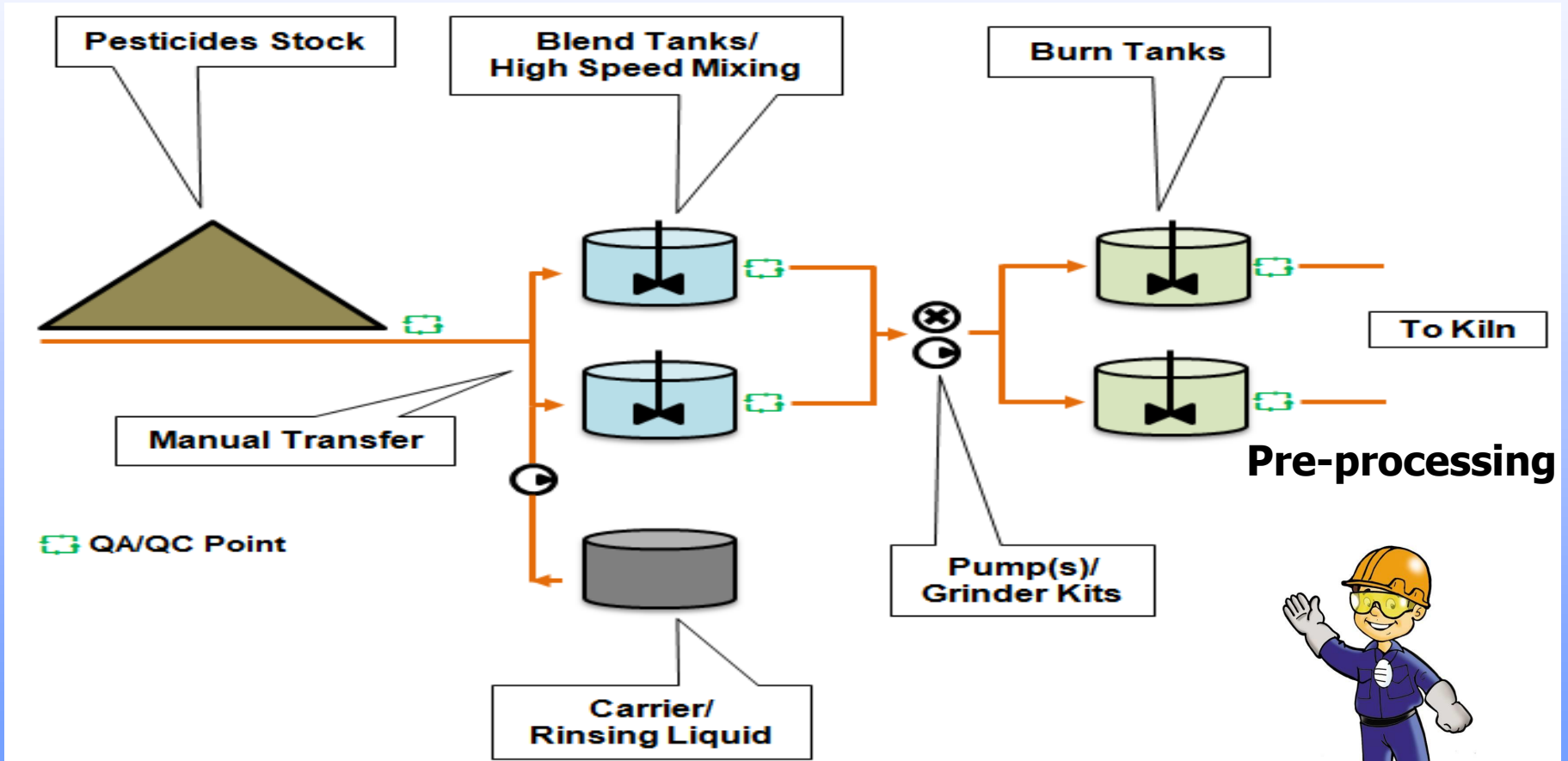
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Pre-processing pesticides

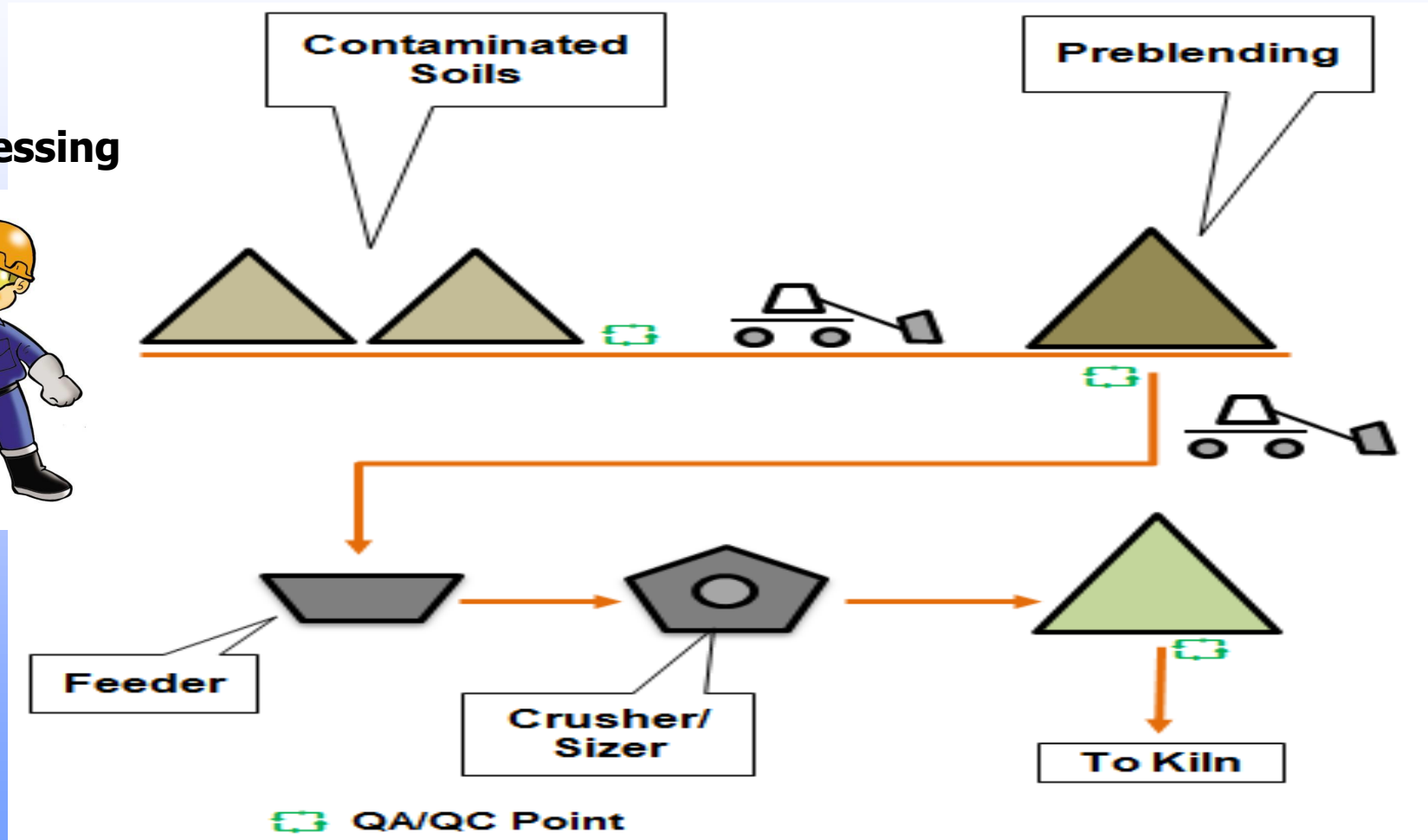
Simplified process flow diagram



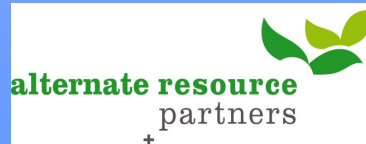
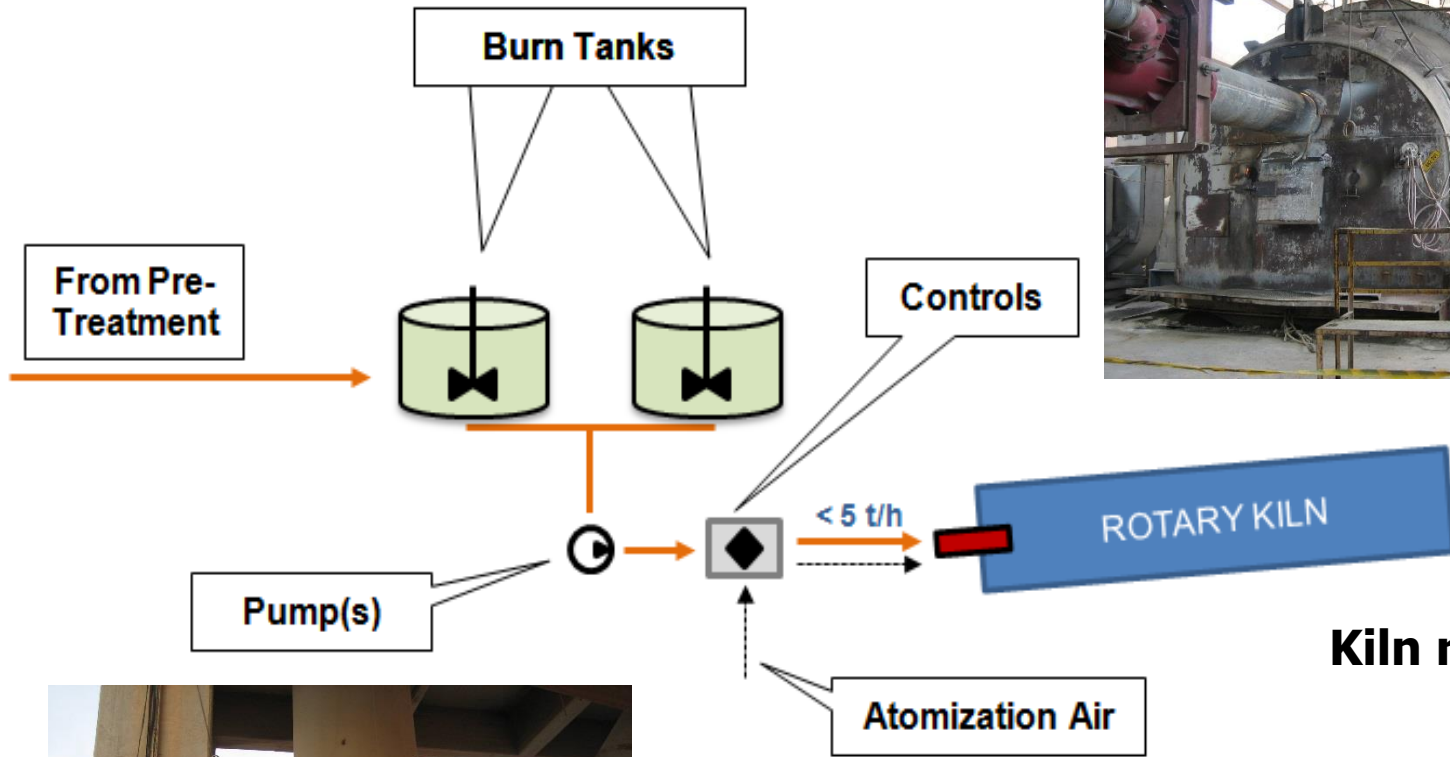
Pre-processing of contaminated soil

Simplified process flow diagram

Pre-processing



Co-processing of pesticides in kiln



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Trial burn testing scheme (in 3 days)

1. Baseline emission testing, Compound mode of operation (with raw mill on) – No Pesticides/soil (one day)
2. Pesticide trial burn emission testing (one day). Compound mode of operation (with raw mill on) – Burning of Pesticides
3. Baseline emission testing, Direct mode of operation (with raw mill off) – No pesticides (one day)



Several results trial burns

DRE

>99.999999998% & 99.999999995%

In 2 different scenarios emissions not effected by POP's

Note: BAT/BEP guidelines of the Stockholm Convention and the Basel Convention, i.e. a DRE of 99.9999%.

Main common conclusions:







- ✓ **Burning of pesticides doesn't significantly affect emissions of cement kiln**
- ✓ **Hazardous wastes destructed well in kiln**
- ✓ **No additional pollution generated with burning of pesticides**
- ✓ **Quality of clinker and cement products not changed**

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Co-processing of POP's: multiplication of references

<p>Formation and Release of POPs in the Cement Industry</p> <p>Second edition</p>  <p>World Business Council for Sustainable Development Cement Sustainability Initiative</p> <p>30 January 2006</p> 	 <p>UNIVERSIDAD CENTROAMERICANA "JOSÉ SIMEÓN CAÑAS"</p> <p>Coprocessing of Alternative Fuels and Raw Materials and a Principal Organic Hazardous Constituent</p> <p>Test Protocol (Trial Burn) Report</p> <p>Prepared by Universidad Centroamericana José Simeón Cañas (UCA) by request of Cemento de El Salvador, S.A. de C.V. (CESSA)</p> <p>August, 2006</p>	<p>Environmental Impact Assessment for Proposed Co-processing of Hazardous Waste in Kiln of Cement Plant at Holcim Cement Works-Puttalam</p>  <p>Draft Report January 2008</p>  <p>E.M.L. Consultants 68, Davidson Road Colombo 4 www.emlconsultants.com</p>  <p>Holcim (Lanka) Ltd Puttalam Cement Works Puttalam www.holcim.lk</p>
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Available online at www.sciencedirect.com



Chemosphere xxx (2007) xxx-xxx

www.elsevier.com/locate/chemosphere

Review

Formation, release and control of dioxins in cement kilns

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Technical guidelines on
the environmentally sound
co-processing of
hazardous wastes in cement kilns

www.basel.int/TheConvention/Publications/TechnicalGuidelines/tabid/2362/Default.aspx

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FAO interest using cement kilns

Interest FAO to use cement kilns for obsolete pesticide stock disposal

Feasibility Study for the environmentally sound destruction and decontamination of obsolete and POPs pesticides in cement kilns in Central Asian countries

Executed on behalf of FAO as part of overall FAO project on obsolete pesticide disposal strategy

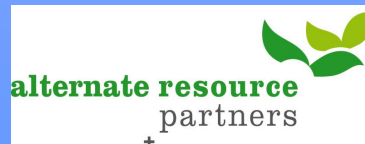


Focus of desktop study

Desktop study focused on following topics:

- ✓ Range and presence obsolete pesticides and contaminated waste
- ✓ Treatment in Cement kilns
- ✓ Handling and Pre-processing
- ✓ Suitable cement kilns
- ✓ Legal and regulatory assessment
- ✓ Stakeholder communication
- ✓ Training and coaching requirements
- ✓ Economic assessment

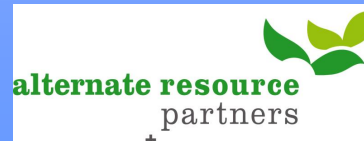
Results recorded in report



Main conclusions & next steps

Main conclusions

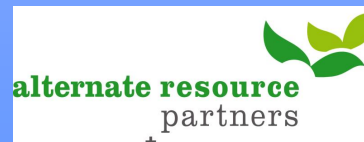
- Treatment obsolete pesticides & pesticide contaminated waste by co-processing in cement kilns is feasible
- Pre-processing needs depend on physical state and composition of obsolete pesticides and pesticide contaminated waste
- Detailed inventory exercise needed to determine exact environmental, organizational, technical and operational requirements
- These requirements will determine nature and set-up of pre-processing facility



Main conclusions & next steps

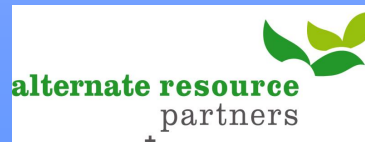
Next steps

- ✓ Extend obsolete pesticide contaminated waste inventories to identify main components, state of material present.
- ✓ Complete basic data collection for identified cement plants
- ✓ Execute field visits to gather, verify environmental, organizational, technical and operational status of local cement plants
- ✓ Research on potential trial burn in local cement plant



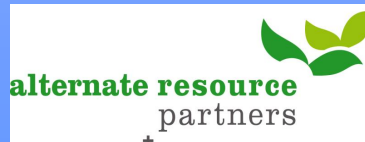
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Observations on way forward

- ❖ Cement companies could be a local sustainable solution for pre-processed pesticides and contaminated soils
- ❖ No long transport routes with these waste materials lower risk and lower cost or bigger volumes for same budget
- ❖ Smaller investments needed in (hazardous) waste disposal infrastructure, government budget can be used for other also much needed infrastructure in emerging countries
- ❖ Cement kilns become part of local (hazardous) waste infrastructure with all permits needed
- ❖ By solving a community problem cement kilns get opportunity to use AFR in their kilns

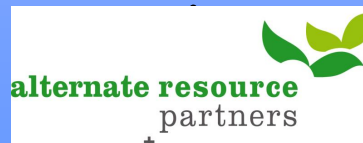


Take home Messages



Take home messages

- There is a great and urgent global need for the services of the cement industry based on general sustainability principles in particular for hazardous waste co-processing in emerging countries, solving legacy issues for the community
- The international principles and philosophy/policy currently developed on AFR practices are among the most responsible and advanced in the industry
- The “*only*” way forward is to document and publish the performance and practise, especially from well designed studies in emerging countries

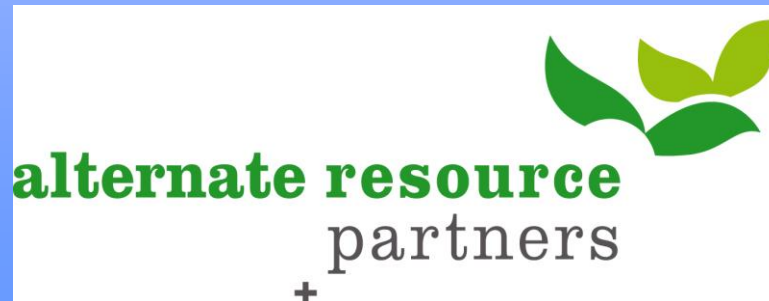


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BACK UP SLIDES

Back up slides



Technical characteristics cement kiln

