

Life cycle Analysis: CCR Versus non-CCR for Cement Production

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DOE/NETL Mercury Control Technology Conference

Pittsburgh, PA

Dec 11 - 13, 2006

Tracking Fate of Hg and Other Pollutants of Concern through Life-Cycle Analysis

- Comparing life-cycle environmental tradeoffs for production of asphalt, cement, and wallboard with and without CCRs – This includes considering
 - Potential pathways of environmental release using results of leaching and thermal stability studies.
 - Stability and species of Hg and other metals in evaluating fate on a life-cycle basis.

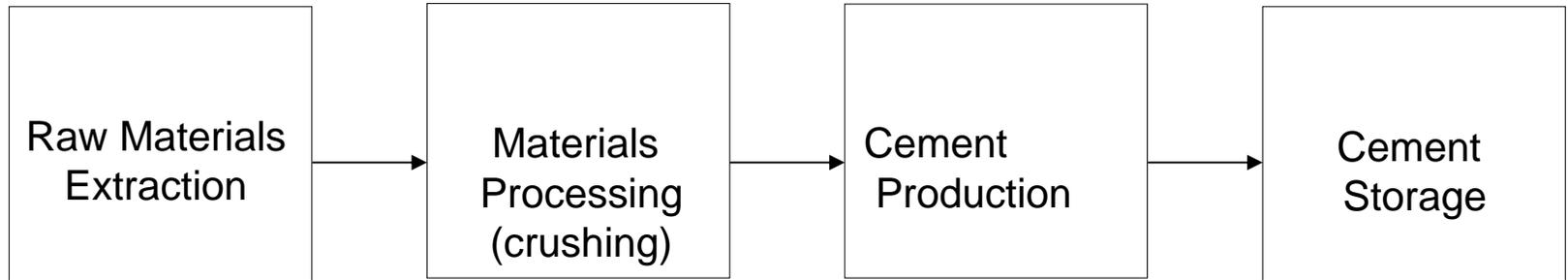
Life-Cycle Comparison of Cement Production using CCR and non-CCR Materials

- Is there a significant increase in metal air emissions from cement plants that utilize CCRs versus non-CCR materials?
- What are the metal and non-metals emission trade-offs resulting from the use of CCRs versus non-CCR materials?

Key Data Sources For LCI Study on Cement Production

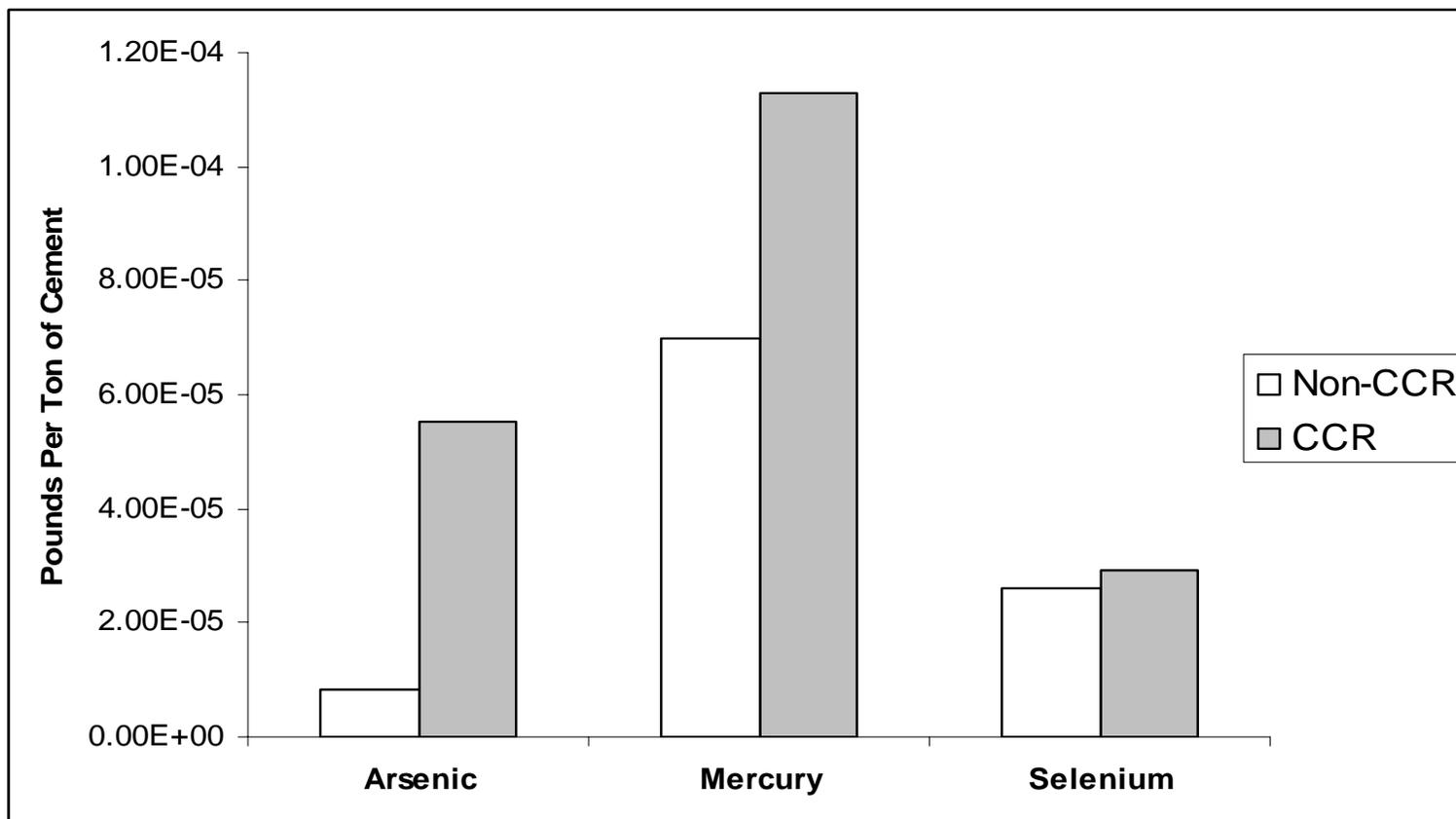
- ATHENA Sustainable Materials Institute for cement production LCI data.
- US EPA for thermal stability of metals in CCRs.
- RTI International for electrical energy related data.
- Portland Cement Association for mercury contents of natural materials.

Life-Cycle Stages Considered



- Analysis results based on CCRs displacing 15% of raw materials (limestone, shale, sand, etc.) used to produce cement.

Preliminary Findings from Life-Cycle Analysis of Production of Cement Using CCR and non-CCR Materials*



*Loss appears to be from cement clinker production and transportation of CCRs

Preliminary Findings of Life-Cycle Analysis of Cement Production using CCR and Non-CCR Materials

- Use of CCRs in cement clinker production typically
 - Offset shale use which decreases hydrocarbon emissions; and
 - Conserves energy due to avoidance of extraction and processing of raw materials for non-CCR cement.
- Potential release of mercury and other metals
 - During cement clinker production; and
 - To transport CCRs to cement plant.
- In 2005, EPA proposed Hg limit of no control on cement production. EPA requested comment on potential release of Hg from coal fly ash use as feed stock in cement clinker production. EPA to release decision on any changes to MACT in Dec 2006.

Questions?



Courtesy of J. Bachmann