DATE: January 11, 2010
RE: Comment on Preliminary Draft Regulation for a California Cap-and-Trade Program

The undersigned companies support the California Air Resources Board's preliminary decision to include in its cap-and-trade program a system for offset credits. The comments contained in this letter encourage CARB to include the use of supplementary cementitious materials in concrete production as a source of offsets recognized and encouraged by the program.

CARB has identified cement manufacturing as a major contributor to greenhouse gas emissions and continues to study issues related to the direct regulation of that industry. CARB has recognized that the concrete production industry is distinct from cement manufacturing and has correctly excluded concrete from direct regulation in its scoping plan. However, both industries can make significant positive contributions to achieving the state's greenhouse gas emissions reductions goals if the cap-and-trade system creates appropriate incentives.

Cement and Concrete Production Compared

Cement is manufactured in a relatively small number of large, centralized plants. According to the Portland Cement Association, in the United States, 39 companies operate 118 cement plants in 38 states. Worldwide, the United States ranks third in cement production, behind China — the world's leading producer — and India. These plants combine raw materials – such as limestone, shells or chalk, and shale, clay, sand, or iron ore – and process the materials in a kiln at high heat to create a product called clinker. Later, cooled clinker is combined with gypsum and ground into a fine gray powder which is portland cement.

Concrete is produced by blending the manufactured cement with aggregates (sand and gravel), water, and sometimes chemical additives to form finished products. Concrete production occurs at many thousands of widely dispersed sites in the United States, including ready mixed concrete batch plants, concrete block manufacturing facilities, precast concrete pipe and product manufacturing facilities and other locations.

Opportunities for Reducing Greenhouse Gas Emissions by Sector

Opportunities for reducing the greenhouse gas footprint of the cement manufacturing facilities themselves can be found in increasing efficiency of operations. Approximately half of greenhouse gas emissions from cement production can be attributed to energy use in operating high temperature kilns and other cement plant equipment. The other half can be attributed to direct emissions from the calcination of raw materials during clinker production. Operational changes at cement manufacturing plants that reduce emissions should be considered direct source reductions and are not a subject of these comments.

Concrete producers can reduce cement-related greenhouse gas emissions by using less cement and thereby reducing the demand for its manufacturing. This strategy can be accomplished by utilizing an array of supplementary cementitious materials in the production of concrete

products, creating an opportunity for demonstrating real and verifiable offsets of emissions from cement production. The remainder of these comments address the opportunity for establishing and verifying these offsets.

Supplementary Cementitious Materials Background

A variety of supplementary cementitious materials (SCMs) are available to reduce cement use during concrete production and more may be developed in the future. These materials include, but are not limited to:

- Coal fly ash
- Ground granulated blast furnace slag
- Silica fume
- Metakaolins
- Rice hull ash
- Natural pozzolans

Each of these materials differs in the embedded energy related to preparing and delivering the material to concrete producers – a factor that can be addressed by assigning separate deduction factors for each SCM in a methodology for demonstrating and verifying SCM-related offsets. But all of the materials likely have opportunities to demonstrate lower greenhouse gas emissions than the cement product they are displacing.

An ample supply of SCMs exists to supply concrete producers. For instance, the American Coal Ash Association reports that nearly 72.5 million tons of coal fly ash were produced in the United States in 2008, of which 42.3 million tons were disposed. Of the approximately 30.2 million tons of fly ash that were used in some beneficial manner, however, only about half were used in the highest value cement and concrete applications. The remainder was utilized in lower value "fill and filler" applications where greenhouse gas emissions reduction benefits are not achieved. At a portland cement replacement rate of 25 percent, there is sufficient coal ash to supplement approximately 275 million tons of portland cement, well in excess of the normal consumption for the United States.

Barriers to increasing the use of coal fly ash in concrete include the high costs of storing material and transporting it to users. Establishing SCM use in concrete production as a qualifying cap-and-trade offset would create additional economic incentive to invest in the infrastructure necessary to deliver these abundant materials to concrete producers and increase their utilization.

"Point of Substitution" Approach to Offset Establishment

Several approaches could be undertaken to establish and verify offsets related to SCM use in concrete production. These include:

- Facility Approach. This approach would focus on the small universe of cement producers and incentivize them to blend SCMs into the finished cement products they deliver to the marketplace. There are a number of disadvantages to this approach, however. Blended cements account for only a small fraction of overall cement sales in the United States, meaning that the opportunity for incentivizing increased cement displacement in forms of concrete production not utilizing blended cements would be lost. A facility approach based on encouraging pre-blended cements would discourage concrete producer innovation in seeking higher rates of cement displacement than are possible at a cement production facility. Finally, cement producers are not able by themselves to document and verify the uses of their product after it is delivered to a concrete producer.

- Project Approach. This approach would focus on documenting offsets on a project by project basis. This approach overcomes the verification shortcomings of a facility approach, but still fails to incentivize the broadest possible use of SCMs. Transaction costs associated with establishing offsets on a project by project basis would ensure that only the largest projects are included, leaving behind the potential of incentivizing higher cement displacement in many thousands of small projects such as residential building foundations, sidewalks, driveways, etc.

- Point of Substitution Approach. This approach would establish offset creation at the point at which an SCM physically displaces a quantity of cement. It would be coupled with the existing delivery documentation that already verifies the addition and amount of SCMs added to concrete mixes subject to established weight and measures regulations. This approach creates regulatory accountability by linking reduction quantification to verification of actual utilization using a single consistent method.

Under a point of substitution approach, numerous parties would be incentivized to reduce cement consumption by substituting SCMs. For instance:

- Cement manufacturers producing blended cements would still qualify as the point of substitution for those products. Instead of capturing these reductions as increases in efficiency at the cement manufacturing plant, the cement manufacturers would more accurately capture the gains as offsets under the point of substitution methodology. (This methodology would require them to coordinate with customers to document and verify the final use of the blended cements to ensure regulatory accountability and avoid any opportunity for double counting.)

- Many cement manufacturers are also vertically integrated – owning their own concrete production facilities. A point of substitution approach to establishing and verifying offsets would allow them to capture offsets at this stage of their operations.

- The full range of other concrete producers would also be incentivized to increase cement replacement with SCMs by following a single, consistent methodology.

Establishing and verifying emissions reduction offsets for concrete production at the point of SCM substitution best ensures regulatory accountability and best encourages achievement of the public policy goal of reducing greenhouse gas emissions. A point of substitution approach will encourage greater SCM utilization in every concrete production activity, whether it involves only a few cubic yards of concrete or hundreds of thousands of cubic yards.

Conclusion

Use of supplementary cementitious materials in concrete production represents an opportunity to create greenhouse gas emissions offsets that are real, permanent, verifiable, enforceable, quantifiable and produced in significant volumes within the state of California. These reductions are linked to reducing the volume of portland cement utilization – rather than increasing the efficiency of cement production – and can be achieved by numerous parties in addition to cement manufacturers. A single consistent methodology for documenting and verifying SCM-related offsets at the point of substitution will create regulatory accountability and most effectively incentivize greater greenhouse gas emissions reductions.

We encourage CARB to establish use of supplementary cementitious materials in concrete production as a form of offsets recognized and encouraged by the California cap-and-trade program. We would welcome additional opportunities to provide input on the structure of a methodology to accomplish this goal.

THE UNDERSIGNED INDEPENDENT READY MIX COMPANIES OPERATING IN CALIFORNIA ENDORSE, AGREE WITH, AND SUPPORT THE COMMENTS IN THIS DOCUMENT.

Sincerely,

7 / 11 MATERIALS INC
BODE GRAVEL COMPANY
CENTRAL CONCRETE SUPPLY
GRANITE ROCK COMPANY
RIGHT AWAY REDY MIX
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