



Mandatory Greenhouse Gas Reporting Rule: EPA's Response to Public Comments

Volume No.: 20

Subpart H—Cement Production

September 2009

Subpart H—Cement Production

U. S. Environmental Protection Agency
Office of Atmosphere Programs
Climate Change Division
Washington, D.C.

FOREWORD

This document provides EPA's responses to public comments on EPA's Proposed Mandatory Greenhouse Gas Reporting Rule. EPA published a Notice of Proposed Rulemaking in the Federal Register on April 10, 2009 (74 FR 16448). EPA received comments on this proposed rule via mail, e-mail, facsimile, and at two public hearings held in Washington, DC and Sacramento, California in April 2009. Copies of all comments submitted are available at the EPA Docket Center Public Reading Room. Comments letters and transcripts of the public hearings are also available electronically through <http://www.regulations.gov> by searching Docket ID *EPA-HQ-OAR-2008-0508*.

Due to the size and scope of this rulemaking, EPA prepared this document in multiple volumes, with each volume focusing on a different subject area of the rule. This volume of the document provides EPA's responses to the significant public comments received for 40 CFR Part 98, Subpart H—Cement Production.

Each volume provides the verbatim text of comments extracted from the original letter or public hearing transcript. For each comment, the name and affiliation of the commenter, the document control number (DCN) assigned to the comment letter, and the number of the comment excerpt is provided. In some cases the same comment excerpt was submitted by two or more commenters either by submittal of a form letter prepared by an organization or by the commenter incorporating by reference the comments in another comment letter. Rather than repeat these comment excerpts for each commenter, EPA has listed the comment excerpt only once and provided a list of significant commenters who submitted the same form letter or otherwise incorporated the comments by reference in table(s) at the end of each volume (as appropriate).

EPA's responses to comments are generally provided immediately following each comment excerpt. However, in instances where several commenters raised similar or related issues, EPA has grouped these comments together and provided a single response after the first comment excerpt in the group and referenced this response in the other comment excerpts. In some cases, EPA provided responses to specific comments or groups of similar comments in the preamble to the final rulemaking. Rather than repeating those responses in this document, EPA has referenced the preamble.

While every effort was made to include all significant comments related to 40 CFR Part 98, Subpart H—Cement Production in this volume, some comments inevitably overlap multiple subject areas. For comments that overlapped two or more subject areas, EPA assigned the comment to a single subject category based on an assessment of the principle subject of the comment. For this reason, EPA encourages the public to read the other volumes of this document with subject areas that may be relevant to 40 CFR Part 98, Subpart H—Cement Production.

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SUBPART H–CEMENT PRODUCTION

1. SELECTION OF PROPOSED GHG EMISSIONS CALCULATION AND MONITORING METHODS

Commenter Name: See Table 1

Commenter Affiliation:

Document Control Number: EPA-HQ-OAR-2008-0508-0509.1

Comment Excerpt Number: 12

Comment: PCA believes strongly that the rationale for collecting CO₂ emissions data does not justify EPA forcing cement plants or fuel-combustion sources to incur the considerable cost of installing and maintaining CO₂ monitors. CO₂ estimation techniques certainly should be adequate, at least for those two source categories, to provide CO₂ emissions data of sufficient accuracy. In fact, it could well be that estimating CO₂ emissions based on sampling raw materials, fuels, and outputs would produce at least as accurate emissions estimates as a continuous CO₂ monitor, given the limitations of those monitors in operation. Plants may choose to undertake the burden of continuous CO₂ monitoring, but they should not be forced to do so by this rule. On the other hand, as written the Proposed Rule appears to require a cement plant that is satisfying emission calculation requirements by using a continuous CO₂ monitor, as allowed under 40 C.F.R. § 98.83(b), nevertheless to collect, maintain, and report various process data related to calculating estimated CO₂ process emissions for kilns, pursuant to proposed sections 98.84-87. If that is indeed what EPA intends, there is no justification for piling on these redundant requirements.

Response: We acknowledge the commenter's concerns. First, we interpreted that the commenter is concerned that all cement kilns must install or maintain CEMS. Only cement kilns that meet the conditions specified in §98.33(b)(5)(ii) or (iii) shall calculate and report combined process and combustion CO₂ emissions by following the Tier 4 Calculation Methodology specified in §98.33(a)(4) and all associated requirements for Tier 4 in 40 CFR 98, subpart C (General Stationary Fuel Combustion Sources).

We agree with the commenter that facilities who are using CEMS to monitor CO₂ do not need to collect, report, and maintain all of the process data required in proposed §98.84-87. However, we determined that some of the process data (such as clinker production) are necessary for verification purposes and determining the reasonableness of reported emissions, and therefore, plants using CEMS are not completely excluded from the requirements in Subpart H. We added clarifying language throughout the Subpart to clearly state which requirements will apply to facilities that use CEMS to measure CO₂ emissions. Specifically, we created separate lists of reporting requirements and recordkeeping requirements that for cement plants using CEMS.

Commenter Name: See Table 1

Commenter Affiliation:

Document Control Number: EPA-HQ-OAR-2008-0508-0509.1

Comment Excerpt Number: 17

Comment: The cement industry is perhaps uniquely situated: it already has an established, proven protocol for estimating and reporting GHG emissions. In 2001, companies participating in the Cement Sustainability Initiative of the World Business Council for Sustainable Development (WBCSD) agreed on a methodology for calculating and reporting CO₂ emissions: the Cement CO₂ Protocol. While accounting for the specific needs of the cement industry, the protocol was closely aligned with the more general greenhouse gas protocol developed under a joint initiative of the WBCSD and the World Resources Institute (WRI). A second, revised version followed, in which the protocol was updated based on extensive practical application of the protocol by many cement companies worldwide, as well as to align it with the March 2004 revised edition of the WRI/WBCSD Protocol. CO₂ Accounting and Reporting Standard for the Cement Industry: The Cement CO₂ Protocol Version 2.0, June 2005, available at <http://www.wbcasd.org/web/publications/cement-tf1.pdf>. PCA urges EPA, rather than create a new and somewhat conflicting set of requirements for GHG recordkeeping and reporting for cement companies, to adopt the Cement CO₂ Protocol Version 2.0 approach for reporting of direct emissions (termed “Scope 1 emissions” in that protocol). Not only would this make reporting by U.S. cement plants consistent with the reporting approach used by cement plants in numerous other countries, it also would take advantage of the extensive study that the industry has already given to GHG reporting issues for cement plants. There simply is no demonstrated need for EPA to reinvent the wheel here, and in fact doing so is inconsistent with the National Technology Transfer and Advancement Act (Public Law 104-113), which requires all federal agencies to make use of voluntary consensus standards to the extent possible. (It appears that EPA may have picked pieces of the Cement CO₂ Protocol for inclusion in Subpart H of the Proposed Rule, without an understanding for how the pieces all fit together and the rationale behind the Cement CO₂ Protocol inputs and calculations.) For example, the Proposed Rule would require cement plants to report emissions of methane and nitrous oxide from fuel combustion at each kiln (and at each stationary combustion unit, as discussed above). The Cement CO₂ Protocol does not require reporting of those emissions, for reasons explained in the cited document. In particular, data indicate that methane and nitrous oxide will be much less than 1% of cement kiln exhaust gases (if present at all). There would be little if any value of collecting data on those two pollutants, since their CO₂-equivalent emissions would be an insignificant fraction of the total CO₂e from the cement kiln and would be less than the confidence interval around the CO₂e emissions calculated without accounting for CH₄ and N₂O. Similarly, the Cement CO₂ Protocol allows use of a default assumption for TOC content of raw materials (0.2%), and the definition of the term TOC_{rm} in Equation H-4 of section 98.83(b)(2) allows use of a 0.2% default assumption in lieu of test data. But the mandatory language of section 98.84(c) of the Proposed Rule could be read nevertheless to require annual testing for TOC content of each category of raw material (i.e. limestone, sand, shale, iron oxide, and alumina). The incremental benefit of requiring such testing, in terms of the potentially improved accuracy of the calculated total plant CO₂e emissions, would be miniscule and does not justify imposing such a testing requirement. The Proposed Rule should be amended to make clear that, if the plant chooses to use the default factor for TOC_{rm} of 0.2 percent of total raw material weight, as allowed under Equation H-4 of section 98.83(b)(2), testing raw materials for TOC content under section 98.84(c) is not required. (EPA should also clarify that proposed section 98.85, which states that “[i]f data on the carbonate content or organic carbon content is missing,

facilities must undertake a new analysis,” does not require cement plants to test raw materials for TOC content if they choose to rely on the default 0.2 percent assumption.) The Proposed Rule’s requirements for separate monthly testing of clinker from each kiln to determine percent by weight of both carbonate and non-carbonate CaO and MgO, and the proposed emission estimation calculation based on those data, departs from the approach developed in the Cement CO₂ Protocol in a way that makes no sense and would not produce better CO₂ emission estimates. In fact, 100% of the CaO and MgO in the clinker is non-carbonate. The proposed monthly testing to determine weight percents of CaO, MgO, non-carbonate CaO, and non-carbonate MgO in clinker from each kiln using an x-ray fluorescence test, specified in proposed section 98.84(b), is therefore unnecessary for purposes of calculating CO₂ emissions. Moreover, it appears that the formula presented in Equation H-3 of section 98.83(b)(2) would always result in a CO₂ emission factor of zero (since the total CaO minus the non-carbonate CaO would be zero).

Response: The response to these comments has been provided in the preamble Section III, Section H, Cement Production.

See also the response to comments for reporting of N₂O and CH₄ emission from fuel combustion in the preamble Section III, Section C, General Stationary Combustion. Given that that these emissions are low relative to CO₂ emissions, we have provided simplified methods and allow use of default factors for estimation of these emissions. Including these emissions provides more complete inventory of GHG emissions from cement plants.

Commenter Name: See Table 1

Commenter Affiliation:

Document Control Number: EPA-HQ-OAR-2008-0508-0509.1

Comment Excerpt Number: 19

Comment: It also should be noted that many, if not most, of the benefits that EPA ascribes to the Proposed Rule already exist by virtue of the Cement CO₂ Protocol. Uniformity of reported data from one facility to another; availability of verifiable data to provide to the public, investors, and others; and other suggested benefits are already available to cement plants through the Cement CO₂ Protocol, and therefore those benefits cannot be used to justify application of the new, different monitoring and reporting requirements of the Proposed Rule to cement plants.

Response: The response to these comments has been provided in the preamble Section III, Section H. Cement Production.

Commenter Name: Craig S. Campbell

Commenter Affiliation: Lafarge North America

Document Control Number: EPA-HQ-OAR-2008-0508-0674.1

Comment Excerpt Number: 1

Comment: To provide the best balance of data accuracy and cost effectiveness it is recommended that all cement plants be afforded the option of using EPA's proposed Tier 3 method (facility-specific calculations) for stationary combustion emissions along with the Subpart H cement production facility-specific calculations for non-combustion emissions. The Tier 4 method (CO₂ CEMs) should remain as an optional choice for any cement plant operator preferring it as an optional method. Lafarge believes it is appropriate that all cement plants have the option of using EPA's proposed Tier 3 method (facility-specific calculations). However, the current proposal affords few plants this option. Of particular concern, EPA's proposal requires that any cement plant with existing CEMs for any other pollutant, and meeting other basic requirements specified in the rule, must install and utilize a CO₂ CEMs. This mandatory requirement of CO₂ CEMs is not reasonable, given that cement plants are able to calculate greenhouse gas emissions with at a sufficient level of accuracy without using CEMs. The cement industry is perhaps uniquely situated in that it already has an established, proven protocol for estimating and reporting GHG emissions. In 2001, Lafarge along with other companies participating in the Cement Sustainability Initiative of the World Business Council for Sustainable Development (WBCSD) agreed on a methodology for calculating and reporting CO₂ emissions: the Cement CO₂ Protocol. While accounting for the specific needs of the cement industry, the protocol was closely aligned with the more general greenhouse gas protocol developed under a joint initiative of the WBCSD and the World Resources Institute (WRI). A second, revised version followed, in which the protocol was updated based on extensive practical application of the protocol by many cement companies worldwide, as well as to align it with the March 2004 revised edition of the WRI/WBCSD Protocol. CO₂ Accounting and Reporting Standard for the Cement Industry: The Cement CO₂ Protocol Version 2.0, June 2005, available at: <http://www.wbcsd.org/web/publications/cement-tf1.pdf> The WBCSD Cement CO₂ protocol can be used in a manner consistent with Lafarge's overall recommendation that cement plants be afforded the option of using EPA's proposed Tier 3 method (facility-specific calculations) for stationary combustion emissions along with the Subpart H cement production facility-specific calculations for non-combustion emissions. As we elaborate below: the Tier 3 method along with Subpart H method has a similar relative accuracy as a CO₂ CEMs, comparable quality assurance programs can be applied to ensure continuing data accuracy, and this method would be more consistent with current well-established industry practices. We do not believe it is appropriate for EPA to impose CO₂ CEMs as mandatory for any kiln regardless of whether CEMs are already installed for other pollutants. The WBCSD Cement CO₂ protocol can be used in a manner consistent with the mandatory aspects of EPA's proposed Tier 3 (facility-specific calculation) method. This Tier 3 method will provide similar or better accuracy compared to CEMs relative accuracy, which for CEMs is typically +/- 7.5 %. The WBCSD Cement CO₂ protocol is the worldwide standard of the industry, and has been in use by many U.S. plants for 5 to 10 years. The industry's extensive experience is that the WBCSD protocol exceeds the +/- 7.5 % accuracy. Furthermore, by requiring plant-specific measurements of fuel carbon and raw material calcinations rather than current industry reliance on default factors, EPA will ensure consistent accuracy of emission calculations. In light of this, EPA's concern on accuracy of default factors can and should be readily resolved by imposing a mandatory requirement to use only plant-specific factors when following the Tier 3 method.

Response: We acknowledge the commenter's concerns. For consistency across the rule we have retained the applicability of conditions of the Tier 4 methodology to cement plants and all

other industrial sources. Only cement kilns that meet the conditions specified in 40 CFR §98.33(b)(4)(ii) or (iii) shall calculate and report combined process and combustion CO₂ emissions by following the Tier 4 Calculation Methodology specified in §98.33(a)(4) of subpart C (General Stationary Combustion). Those facilities that do not meet these conditions do have flexibility in reporting combustion emissions from kilns using the applicable methods provided in subpart C.

See also the response to comment EPA-HQ-OAR-2008-0508-0509.1, excerpt 19.

Commenter Name: Craig S. Campbell

Commenter Affiliation: Lafarge North America

Document Control Number: EPA-HQ-OAR-2008-0508-0674.1

Comment Excerpt Number: 2

Comment: EPA improperly dismisses the Cement Sustainability Initiative (WRI/WBCSD) protocol as a simplified calculation methodology. As stated by EPA: Under option 3, facilities would calculate emissions using simple inputs that are usually already measured for other reasons, and EPA supplied default emission factors (many of which have been developed by industry consortiums, such as the World Resources Institute/World Business Council for Sustainable Development (WRI/WBCSD)(Cement Sustainability Initiative) Protocol). The default emission factors would represent national average factors. These methods and emission factors would not take into account facility-specific differences in processes or in the composition of raw materials, fuels, or products. Option 3 (simplified calculation methods) was not chosen because the data would be less accurate than option 2 and would not make use of site-specific data that many facilities already have available and refined calculation approaches that many facilities are already using. Lafarge disagrees with EPA's assessment of the WBCSD Cement CO₂ protocol. While the WBCSD cement protocol does provide the option of using default factors, this is only one of the options. The WBCSD cement protocol is designed such that it is fully compatible with using plant-specific factors. By EPA taking the simple step of requiring plant-specific factors, the "default-factor weakness" would be eliminated. Lafarge recommends that the cement sector be allowed to use the WBCSD Cement CO₂ protocol with plant-specific factors which essentially can be done in a manner mirroring EPA's proposed Tier 3 method (Subpart) C with proposed Cement Production method (Subpart H).

Response: The response to these comments has been provided in the preamble Section III, Section H. Cement Production. While finalizing today's rule, we revisited the Cement CO₂ Protocol and compared its requirements to our requirements. We feel that the rule closely mirrors the GHG estimation methods and requirements of the Cement CO₂ Protocol with some minor differences. In addition to requiring facilities to use facility-specific emission factors, we determined that other requirements were necessary to ensure accurate and consistent GHG reporting across the industry. For example, the Cement CO₂ Protocol does not specify measurement methods. Our rule specifies methods for measuring CaO, MgO, and clinker weight. We selected these methods to be consistent with measurement techniques that are common within the cement industry. Prescribing standardized measurement procedures ensures the uniformity and consistency in the results and quality of data reported that the commenters

agree is important for comparability of emissions.

Commenter Name: Craig S. Campbell

Commenter Affiliation: Lafarge North America

Document Control Number: EPA-HQ-OAR-2008-0508-0674.1

Comment Excerpt Number: 3

Comment: At 74 Fed. Reg. 16475 of the preamble to the proposed rule EPA indicates that its proposal strikes the right balance between accuracy and cost. As EPA states: For the proposed rule, EPA selected option 2 (combination of direct measurement and facility-specific calculations) as the general monitoring approach. EPA asserts this option strikes the right balance between data accuracy and cost. It makes use of existing data and methodologies to the extent feasible, and avoids the cost of installing and operating CEMs at numerous facilities. Lafarge would agree with EPA's proposed selection of option 2 only if CO₂ CEMs are truly an option not a mandatory requirement as for the subset of cement kilns currently identified as mandatory in the rule. As proposed, CO₂ CEMs are mandatory when any type of certified CEM or flow meter is already installed. Thus these particular cement kilns with some type of monitor already installed would not truly have the two options EPA mentions under its option 2. Importantly, since not all existing cement kiln monitoring systems are identical, the feasibility of installing a new CO₂ CEM can vary considerably from one facility to another. Lafarge's assessment is that the typical capital and operating costs of adding new CO₂ CEMs would be significant at most plants (this is discussed in more detail under Lafarge's next comment). However, the important point we wish to make here is that any additional costs for a new (and duplicative) monitoring system would be unwarranted given the already well-established WBCSD Cement CO₂ protocol (which will provide high accuracy when used with facility-specific factors). We maintain that EPA's proposed option 2 does not "strike the right balance between data accuracy and cost." Lafarge strongly recommends that all cement kilns should have the option of using the Tier 3 method (facility-specific calculations) in a manner consistent with the well-established WBCSD Cement CO₂ protocol.

Response: See also the response to comment EPA-HQ-OAR-2008-0508-0674.1, excerpt 1. We acknowledge the commenter's concerns. We set the conditions for the Tier 4 methodology to balance between data accuracy and cost. For consistency across the rule we have retained the applicability of conditions of the Tier 4 methodology to cement plants and all other industrial sources. Only cement kilns that meet all six of the conditions specified in 40 CFR §98.33(b)(4)(ii) or all three of the conditions in 98.33(b)(4)(iii) shall calculate and report combined process and combustion CO₂ emissions by following the Tier 4 Calculation Methodology specified in §98.33(a)(4) of subpart C (General Stationary Combustion). Those facilities that do not meet these conditions do have flexibility in reporting combustion emissions from kilns using the applicable methods provided in Subpart C.

For the Proposed Rule, we calculated costs for measuring and reporting process and combustion emissions. To calculate the first-year capital costs and annualized costs, we assumed that a small portion of the cement industry would use an existing CO₂ CEMS to measure emissions, another portion would retrofit an existing NO_x CEMS with CO₂ CEMS, and the remaining facilities

would use calculation methods to estimate emissions. We assumed that CEMS would capture both process emissions and combustion emissions, and therefore, costs for operating CEMS covers the cost of measuring both process- and combustion-related emissions. For facilities using the calculation method, we calculated costs for estimating both process emissions and combustion emissions. We determined that the calculated costs are appropriate for the cement industry, which is one of the largest sources of CO₂ emissions among the manufacturing sectors..

See also the response to comment EPA-HQ-OAR-2008-0508-0509.1, excerpt 19.

Commenter Name: See Table 2

Commenter Affiliation:

Document Control Number: EPA-HQ-OAR-2008-0508-0635

Comment Excerpt Number: 48

Comment: In general, we support the inclusion of all cement production facilities in the United States under the proposed mandatory reporting rule. Cement production is a very emissions intensive process (releasing carbon dioxide as both a process and combustion gas), and emissions vary depending both on the type of cementations material used and feed fuel burned. Therefore, it is important to create a reporting framework that takes the individual production practices of each cement kiln into account. As discussed in the proposed rule, calculating facility-specific emissions factors based on a “clinker methodology” and TOC (total organic content) of raw materials provides a critical understanding of the emissions from each cement kiln. Such an approach is similar to that used by the California Air Resources Board under its mandatory reporting rule and other voluntary cement production accounting protocols for greenhouse gas emissions. However, as identified by CARB and others, facility-specific emissions calculations must be developed using state-of-the-art composition analyzers (for carbonate content of raw material) as well as well calibrated conveyor belt speed monitors. In addition to employing the clinker based method, the proposed regulation, like the CARB regulation, recognizes the value of continuous emissions monitors for providing accurate, real time emissions calculations. Where possible, properly calibrated CEMS should be used in place of emissions factors, thereby providing the most reliable emissions estimates possible. However, facilities using CEMS should also be able to supply clinker based emissions estimates in the event that CEMS become inoperative, thereby obviating the need for missing data provisions. This is the recommended approach of the reporting rule and one that EPA should retain in the final rule.

Response: In developing the Proposed Rule, we considered many domestic and international GHG monitoring guidelines and protocols, including the CARB regulation. We acknowledge the commenter’s assertion that the CARB requires facilities to use state-of-the-art analyzers. The monitoring requirements that we have included in §98.84 are intended to minimize burden on the industry by requiring facilities to use monitoring equipment currently used on-site for accounting purposes and measurement methods that are common within the cement industry. We have determined that these methods are of adequate accuracy for estimating CO₂ emissions for this rule.

In the event that CEMs become inoperative, the Tier 4 methodology in subpart C (General Stationary Combustion) provides the appropriate missing data procedures in §98.35. Given that the CEMs will be monitoring total combined process and combustion related emissions from kilns, we disagree that clinker based emissions estimates will suffice as missing data in that a CEMs becomes inoperative. Clinker based estimates would only provide an estimate for process-related CO₂ emissions from kilns but not the combustion related CO₂ emissions which are generally of the same magnitude.

However, we agree that some of the process data (such as clinker production) are necessary for verification purposes and determining the reasonableness of reported emissions, and therefore, plants using CEMS are not completely excluded from the requirements in Subpart H. We added clarifying language throughout the Subpart to clearly state which requirements will apply to facilities that use CEMS to measure CO₂ emissions. Specifically, we created separate lists of reporting requirements and recordkeeping requirements that for cement plants using CEMS.

2. DETAILED GHG EMISSION CALCULATION PROCEDURES/EQUATIONS IN THE RULE

Commenter Name: See Table 1

Commenter Affiliation:

Document Control Number: EPA-HQ-OAR-2008-0508-0509.1

Comment Excerpt Number: 14

Comment: In that regard, in Equation 11-2 in proposed section 98.83(b)(2), CKDi should be defined as “CKD not recycled to the kiln,” not as “CKD discarded.” The former is what cement plants typically keep track of, and it is the value needed to calculate the CO₂ emissions associated with CKD. The term “discarded” has specific regulatory significance under Solid Waste Disposal Act regulations and state laws, and CKD that meets the definition of “discarded” may be a subset of the CKD not recycled to the kiln. (In a related matter, EPA’s definition of EFCKDi,m in Equation 11-2 in proposed section 98.83(b)(2), “Kiln specific fraction of calcined material in CKD not recycled to the kiln, for quarter i from kiln m, as determined in paragraph (c)(2)(i),” is inaccurate in several respects. First, there is no section 98.83(c)(2)(i)—the apparent intended reference is to section 98.83 (b)(2)(i). (A similar incorrect reference, to section 98.83 (c)(2)(ii), is contained in proposed section 98.83(b)(2)(i) itself.) More importantly, EFCKDi,m, the CO₂ emission factor, is not the CKD calcination rate, rather it is calculated from the clinker emission factor and the CKD calcination rate.)

Response: We have changed all references of “CKD discarded” to “CKD not recycled to the kiln” throughout Subpart H. In addition, we have restructured 98.83 and made several changes to the equations for calculating emission factors. See Equation H-4 in section 98.83(b)(2)(ii) for our revised calculation of the CKD CO₂ emission factor.

Commenter Name: Craig S. Campbell
Commenter Affiliation: Lafarge North America
Document Control Number: EPA-HQ-OAR-2008-0508-0674.1
Comment Excerpt Number: 19

Comment: When Subpart H mandates Tier 4 methodology under proposed rule §98.83, it cross-references to §98.33(b) (5). However, §98.83 does not cross-reference to §98.33(b) (6). §98.83 should be revised to make clear that the provisions of §98.33(b) (6) apply if §98.33(b) (5) applies to a cement kiln under Subpart H.

Response: We thank the commenter for identifying this inconsistency. We have revised references to 98.33(b)(5) and 98.33(b)(6) in 98.83.

3. MONITORING AND QA/QC REQUIREMENTS

Commenter Name: See Table 1
Commenter Affiliation:
Document Control Number: EPA-HQ-OAR-2008-0508-0509.1
Comment Excerpt Number: 13

Comment: Proposed 40 C.F.R. §§ 98.84(e) and (f) seem to require continuous, direct weight measurement of CKD discarded and raw materials used, by category of material. Most cement plants do not have that capability, but the Proposed Rule does not state clearly that (or whether) installation of additional measurement equipment will be required if not already installed. Moreover, installation of such additional measurement equipment is unnecessary and could not be justified by the small incremental benefit in terms of more accurate emissions information. Cement plants should be allowed to continue to use the methods they have been using for determining raw materials and cement kiln dust.

Response: We revised the text in §98.84(e) and (f) to more clearly state that CKD quantities are required to be measured on a quarterly basis and raw material quantities are required to be measured on a monthly basis. Furthermore, the Proposed Subpart H was never intended to require installation of new monitoring equipment. We agree with the commenter that continuous, direct weight measurement of these materials, and installation of additional measurement equipment for this purpose, would be unnecessary. The Proposed Rule clearly states that the quantity of CKD produced and raw materials consumed must be determined using the same plant instruments that the cement plant currently uses for accounting purposes. Moreover, because the quantities of raw materials and CKD do not greatly impact the CO₂ estimation, we added further clarification to this section to allow cement plants to use potentially less accurate methods, but commonly used methods, of measurement, such as truck weigh scales, to determine quantities of CKD and raw materials.

Commenter Name: See Table 1

Commenter Affiliation:

Document Control Number: EPA-HQ-OAR-2008-0508-0509.1

Comment Excerpt Number: 18

Comment: It seems there is either a misunderstanding of the process, or incorrect wording, regarding the testing for CaO, MgO, non-carbonate CaO, and non-carbonate MgO in clinker. The CaO and MgO are inherently non-carbonate—in the raw materials and/or in the clinker. It appears that the confusion arises because Ca and Mg in raw materials may be present in carbonate or non-carbonate form. Therefore, EPA should revisit the regulation wording so that the proper testing and accounting protocol of carbonate and non-carbonate Ca and Mg occurs for the raw materials, while the total amount of CaO and MgO is determined in the clinker. This would insure that the CO₂ from the raw materials is properly determined.

Response: We agree with the commenter that the weight percents of non-carbonate determinations of CaO and MgO must be measured in the raw feed. Therefore, we have revised equations in 98.83 to account for noncalcined CaO and MgO. Non-calcined CaO is CaO that remains the clinker or CKD in the form of CaCO₃ and CaO in the clinker and CKD that entered the kiln as a non-carbonate species. Similarly, non-calcined MgO is MgO that remains in the clinker and CKD in the form of MgCO₃ and MgO in the clinker and CKD that entered the kiln as a non-carbonate species. Under Section 98.84, we require cement plants to determine the quantities of noncalcined CaO and MgO using careful chemical analysis of feed material, clinker material, and CKD from each kiln using well documented analytical and calculational methods. We also allow cement plants to use a default factor of 0.0 for noncalcined CaO and MgO.

Commenter Name: Craig S. Campbell

Commenter Affiliation: Lafarge North America

Document Control Number: EPA-HQ-OAR-2008-0508-0674.1

Comment Excerpt Number: 8

Comment: In Subpart H, per proposed 40 CFR § 98.84(d) “The quantity of clinker produced monthly by each kiln must be determined by direct weight measurement using the same plant instruments used for accounting purposes, such as weigh hoppers or belt weigh feeders.” Lafarge agrees with EPA that accurate measurement of clinker production is required for the Subpart H clinker-based emission calculation. However, our research indicates that plants typically do not employ weigh scale systems to measure clinker exiting the kiln or clinker cooler. When clinker exits the kiln, it empties immediately to the clinker cooler. Once it passes through the clinker cooler, it drops onto a drag or screw conveyance system and is transported to the finish mill or to clinker storage. When the clinker exits the clinker cooler, it is still extremely hot and cannot be transported to storage by conventional belt conveyor systems. Because drag and screw conveyance systems are not designed to incorporate weigh scale systems, a large majority of cement plants measure clinker production by using a measuring system for the raw mix fed to the kiln and applying a standard feed-to-clinker conversion factor. In the pyroprocessing system, feed-to-clinker conversion is very constant. Consequently, the use of a weigh scale system on raw feed coupled with feed-to-clinker conversion is a sufficiently accurate method of

determining clinker production. Furthermore, common practice is to validate the calculated clinker production using cement product shipment data from commercial government-certified weigh scales. Therefore, Lafarge proposes that EPA amend § 98.84(d) to allow for three monitoring options: (1) use a clinker weigh scale system; (2) use a raw mix weigh scale system and apply a site-specific feed-to-clinker conversion factor; or (3) use another method approved by EPA. It is expected that option (2) will be the method used by a majority of sources.

Response: We acknowledge the comment that it is common practice within the cement manufacturing industry to determine clinker production based on kiln feed quantities and a feed-to-clinker ratio. However, to remain consistent with the cement industry's existing CO₂ protocol, we based emission calculations on kiln output rates rather than kiln input rates. The rule allows facilities to determine output rates using any type of direct weight measurement used at the plant for accounting purposes.

Commenter Name: Craig S. Campbell

Commenter Affiliation: Lafarge North America

Document Control Number: EPA-HQ-OAR-2008-0508-0674.1

Comment Excerpt Number: 9

Comment: In Subpart H, per proposed 40 CFR § 98.84(e) and (f) the quantity of CKD discarded and quantity of all raw materials consumed must be determined by direct weight measurement using the same plant instruments used for accounting purposes, such as weigh hoppers or belt weigh feeders.” Weigh hoppers and/or belt weight feeders are not commonly used for measuring the amounts of CKD removed from the process. Lafarge recommends that EPA clarify that truck weigh scales are also an acceptable option for weight measurement of CKD. Weigh hoppers and/or belt weight feeders are commonly used for measuring raw materials consumed by the process. However, in some limited cases it may be appropriate to use truck weigh scales for raw materials consumed. Therefore, Lafarge also recommends that EPA clarify that truck weigh scales are an acceptable option for raw material weight measurement (to address certain limited cases).

Response: EPA agrees with the commenter that less accurate methods may be used to determine weights of raw materials and CKD. We expect that CO₂ emissions estimated based on CKD and raw material weight to be small relative to the emissions based on clinker weight. Therefore, we have revised sections 98.84(e) and (f) to allow cement plants the option to use truck weigh scales to measure raw material and CKD weight.

Commenter Name: Craig S. Campbell

Commenter Affiliation: Lafarge North America

Document Control Number: EPA-HQ-OAR-2008-0508-0674.1

Comment Excerpt Number: 10

Comment: In Subpart H, per proposed 40 CFR § 98.84(a), CKD sampling and analysis must be “conducted quarterly for each kiln from a CKD sample drawn from bulk CKD storage.” Lafarge

recommends the regulatory wording be changed to allow the samples to be taken either as the CKD is exiting the process, or from bulk storage.

Response: We agree with the commenter, and have revised 98.84(a) to allow cement facilities to draw CKD samples either as CKD exits the process or from bulk CKD storage. Both methods should provide comparable information for this rule.

Commenter Name: Craig S. Campbell
Commenter Affiliation: Lafarge North America
Document Control Number: EPA-HQ-OAR-2008-0508-0674.1
Comment Excerpt Number: 7

Comment: In Subpart H, per proposed 40 CFR § 98.84(b) it is specified that cement plant operators must determine the weight percents of CaO, MgO, non-carbonate CaO, and non-carbonate MgO in clinker from each kiln using an x-ray fluorescence test or other enhanced testing method. Lafarge wishes to clarify that the non-carbonate CaO and MgO determinations need to be made by testing raw materials rather than clinker. The purpose of this particular measurement is to “make a correction” to the clinker-based calculation in order to account for any non-carbonated CaO or MgO in the raw materials. Any non-carbonated CaO or MgO in the raw materials will result in an equivalent amount of CaO or MgO in the clinker, without any CO₂ being liberated from the production process from the raw material non-carbonated CaO/MgO. Since the clinker-based calculation (without a correction step) assumes each mole of CaO and MgO present in the clinker has been associated with release of one mole of CO₂, there will be an over-calculation of CO₂ release if non-carbonated CaO and MgO in the raw material is not taken into account using this correction step.

Response: See the response to comment EPA-HQ-OAR-2008-0508-0509.1, excerpt 18.

4. DATA REPORTING REQUIREMENTS

Commenter Name: See Table 1
Commenter Affiliation:
Document Control Number: EPA-HQ-OAR-2008-0508-0509.1
Comment Excerpt Number: 15

Comment: The data reporting requirements for cement plants, set forth in proposed 40 C.F.R. § 98.86, are expressed in different terms than those used for the specified procedures for estimating emissions, without any further explanation. For example, it is unclear what emission sources go into the “site-specific emission factor (metric tons CO₂/metric ton clinker produced)” required to be reported under proposed section 98.86(h) and how that factor would be calculated. Is the numerator all CO₂ emissions from the plant, all CO₂ emissions from the cement kilns, or CO₂ emissions only from process, and not fuel combustion, elements of the kiln exhaust gases?

Proposed section 98.86 refers, apparently incorrectly, to reporting of “the information required by §98.3(b)” — apparently this is intended to refer to section 98.3(c). But even correcting for that error, it is entirely unclear what reporting would be required, and in what form, for a cement plant. Section 98.3(c) appears to contemplate an annual report that contains separate reporting for fuel combustion and for process sources of GHGs, but the specific emission calculation and reporting provisions for cement plants seems to specify reporting of CO₂ emissions from the combination of chemical processes and carbonaceous fuel combustion occurring in a cement kiln. Under proposed Section 98.3(c)(4), each annual report “shall contain” information on annual “emissions of CO₂, CH₄, N₂O, and each fluorinated GHG,” but the proposed regulations at section 98.82 contain no provisions requiring a cement plant to calculate or report fluorinated GHG emissions.

Response: We agree with the commenter that there were inconsistencies between sections §98.83 and §98.86. We updated reporting requirements in §98.86 to be consistent with the terms used in the emission estimation procedures in §98.83. As a result, some calculations that are performed on a kiln-specific basis, such as CO₂ emission factors, will be required to be reported on a kiln-specific basis in §98.86. To our knowledge, cement production facilities do not generate fluorinated emissions and therefore we have not added procedures for reporting of these emissions. This is why we have not listed fluorinated GHG emissions under §98.82 “GHGs to report” for cement production in Subpart H. Cement production facilities should report emissions for those GHGs listed in §98.82.

Regarding the GHG to report, the final rule has clarified that facilities must report only the GHG for which calculation methodologies are specified in an applicable subpart.

Commenter Name: Craig S. Campbell

Commenter Affiliation: Lafarge North America

Document Control Number: EPA-HQ-OAR-2008-0508-0674.1

Comment Excerpt Number: 16

Comment: Cement plants using the Subpart C – Stationary Fuel Combustion Tier 3 method and therefore subject to Subpart H - Cement Production for process (e.g., calcination) emissions are required by § 98.86(e) to report the total annual fraction of cement kiln dust recycled to the kiln. Not all cement kilns have accurate measurement system for this “internal recirculation” of cement dust within the kiln process. Further, this dust return value does not appear to be relevant to EPA’s greenhouse gas data needs. In light of these points, Lafarge recommends that the requirements for reporting information on dust return internal to the process be removed from the rule.

Response: We agree with the commenter that measuring and reporting quantities of recycled CKD is unnecessary for estimating CO₂ emissions. Therefore, we revised section 98.86 to only require cement plants to report the quantity of CKD not recycled to the kiln.

Commenter Name: Craig S. Campbell
Commenter Affiliation: Lafarge North America
Document Control Number: EPA-HQ-OAR-2008-0508-0674.1
Comment Excerpt Number: 18

Comment: Subpart H of the proposed rule specifies data reporting requirements in § 98.86, and records that must be retained in § 98.87. EPA explanatory language on page 16495 of the preamble it appears to clearly explain EPA's intent that cement kilns using the Tier 4 (CEMs) method are not required to follow any aspect of Subpart H including these reporting & recordkeeping requirements stated in Subpart H. However, the proposed rule language is ambiguous as to whether these reporting & recordkeeping requirements apply when the Tier 4 method is being used. Lafarge recommends that EPA provide clarifying language within Subpart H that all of the requirements detailed in the Subpart do not apply to cement kilns using Tier 4 (CEMs) method.

Response: See also the response to EPA-HQ-OAR-2008-0508-0509.1 excerpt 12. Facilities using CEMS to monitor CO₂ do not need to collect, report, and maintain all of the process data required in proposed §98.84-87. However, we determined that some of the process data are necessary for verification purposes (such as clinker), and therefore, plants using CEMS are not completely excluded from the requirements in Subpart H. We added clarifying language throughout the Subpart to clearly state which requirements will apply to facilities that use CEMS to measure CO₂ emissions. Specifically, we created separate lists of reporting requirements and recordkeeping requirements that for cement plants using CEMS.

Commenter Name: Craig S. Campbell
Commenter Affiliation: Lafarge North America
Document Control Number: EPA-HQ-OAR-2008-0508-0674.1
Comment Excerpt Number: 17

Comment: In addition, EPA proposes facilities using the Subpart H - Cement Production methods for calculation of process (e.g., calcination) emissions submit annual analysis of carbonate composition, total annual fraction of calcination achieved (for each carbonate), organic carbon content of raw material, and the amount of raw material consumed annually. Reporting all of these data increases the reporting burden significantly and in some cases would require additional calculations not otherwise required for reporting actual emissions of greenhouse gases. This level of detail might be appropriate for emissions monitoring and reporting requirements to demonstrate compliance with specific emission limitations, but they go far beyond what is needed in order to understand amounts and sources of cement industry greenhouse gas emissions. Lafarge recommends EPA revise its proposal to require that records be kept at the facility of all of the required carbonate, calcination, organic carbon, and consumption of raw materials data – and that EPA remove the requirement for reporting this data in the facility's annual report.

Response: See section II.N of this preamble for the response on the emissions verification approach. We have revised the reporting requirements in 98.86 to be consistent with the calculation parameters presented in equations in 98.83. We have determined that parameters used in the calculations are necessary for EPA to verify reported emissions. The monthly clinker production, annual cement, monthly clinker content of total- and non-calined CaO and MgO, quarterly CKD production, quarterly CKD content of total- and non-calined CaO and MgO in clinker, monthly raw material consumption, and monthly organic carbon content of raw materials must be measured on a kiln-specific basis to estimate CO₂ emissions, as described in 98.83. These parameters are necessary and/or required in 98.86(b) parameters for EPA to verify the calculation and also assess the reasonableness of the reported CO₂ emissions.

5. COST DATA

Commenter Name: See Table 1

Commenter Affiliation:

Document Control Number: EPA-HQ-OAR-2008-0508-0509.1

Comment Excerpt Number: 2

Comment: Cement manufacturing would bear a disproportionate share of this excessive information gathering. EPA estimates that cement plants produce 2% of domestic CO₂e emissions, and yet the Proposed Rule would impose first-year capital costs on the sector that are three times as great as their share of emissions (6% of all first-year capital costs) and annualized costs twice as great as their share of emissions (4% of all annualized costs). See Table VIII-1., 74 Fed. Reg. at 16,597. At an EPA-estimated annualized cost of \$65,000 per facility, and 0.2% of sales, cement plants would be one of the sectors hardest-hit by the Proposed Rule. See Table VII-5, 74 Fed. Reg. at 16,001. The preamble to the Proposed Rule is not entirely clear, but it appears that the costs cited for the Cement Production sector only cover the process emissions, and not emissions from fuel combustion, which would require additional expenditures by these plants to comply with the Proposed Rule.

Response: The costs presented in the preamble cover combined process and combustion emissions. To calculate the first-year capital costs and annualized costs, we assumed that a small portion of the cement industry would use an existing CO₂ CEMS to measure emissions, another portion would retrofit an existing NO_x CEMS with CO₂ CEMS, and the remaining facilities would use calculation methods to estimate emissions. We assumed that CEMS would capture both process emissions and combustion emissions, and therefore, costs for operating CEMS covers the cost of measuring both process- and combustion-related emissions. For facilities using the calculation method, we calculated costs for estimating both process emissions and combustion emissions. We determined that the calculated costs are appropriate for the cement industry, which is one of the largest sources of CO₂ emissions among the manufacturing sectors.

6. OTHER SUBPART H COMMENTS

Comment: Generally across the rule, commenters requested clarification on use of standards and in some cases proposed alternative standards for determining particular parameters used to estimate emissions.

Response: For Subpart H, we decided to specify the use of a specific ASTM standard for a key calculation parameter (carbonate contents of clinker and CKD) and allow flexibility for other key parameters. EPA has not prescribed specific methods, but provided guidance, for determining the quantity of raw materials consumed, clinker produced and CKD not recycled to the kiln, requiring that facilities use methods and/or plant instruments used for accounting purposes. Where we have prescribed specific methods, there are few methods that are appropriate. For example, there is one generally accepted ASTM standard used by sources for determining carbonate contents of clinker and CKD not recycled to the kiln. We have prescribed those two standards commonly used by industry to minimize burden. Use of these methods ensures consistency in the determination of key parameters and calculated emissions from the cement production industry. The response to comments proposing the use of defaults as an alternative to proposed standards for determining site-specific emission factors is provided in the preamble section III, section H. Cement Production.

Table 1

COMMENTS	AFFILIATE	DCN
Michel R. Benoit	Cement Kiln Recycling Coalition (CKRC)	EPA-HQ-OAR-2008-0508-0467
Andrew T. O'Hare	Portland Cement Association (PCA)	EPA-HQ-OAR-2008-0508-0509.1

Table 2

COMMENTS	AFFILIATE	DCN
Craig Holt Segall	Sierra Club	EPA-HQ-OAR-2008-0508-0635.1
Melissa Thrailkill	Center for Biological Diversity	EPA-HQ-OAR-2008-0508-0430.1