Suwannee American Cement
P.O. Box 410
Branford, FL 32008-0410
Phone (386) 935-5000 Fax (386) 935-5080

March 17, 2015

Jeff Koerner, Administrator
Air Permitting and Compliance Program
Division of Air Resource Management
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399
Jeff.koerner@dep.state.fl.us

Re: **1210465 Suwannee American Cement -- Request for Extension of Compliance Date under Portland Cement NESHAP, 40 CFR Part 63, Subpart LLL Branford Cement Plant, AIRS ID: 1210465 Kiln, Emission Unit EU004**

Dear Mr. Koerner:

Pursuant to the requirements of 40 CFR 63.6(i)(4) as adopted by reference at 62-204.800(d) F.A.C. and under the authority of 42 USC 7412(i)(3)(B), Suwannee American Cement (SAC) submits this request for an extension of the date for compliance with certain requirements of the Portland Cement NESHAP, 40 CFR Part 63, Subpart LLL ("PCMACT") for its Branford, Florida cement facility. SAC is requesting an extension to demonstrate compliance to the PCMACT for the kiln emissions unit. Specifically, SAC is requesting the extension for the kiln to comply to the mercury (Hg) standard until September 9, 2016.

Background

SAC is currently limited by its Title V permit to 97 lb/12-month rolling period of mercury (Hg) emissions to be demonstrated by material balance via recordkeeping of material use and Hg concentration analysis. With the February 2013 promulgation, U.S. EPA finalized a Hg emissions standard for existing kilns of 55 pounds per million ton of clinker per 40 C.F.R. 63.1343. The rule promulgation also incorporates continuous Hg monitoring requirements subject to 40 CFR 60 performance specifications and auditing.

SAC has been assessing the facility's ability to prospectively comply with the applicable Hg standard provisions of the PCMACT for which compliance is required by September 9, 2015. SAC believes that it can achieve compliance with the NESHAP Hg standard for the kiln (EU004) with a combination of dust shuttling and raw material source management. SAC strongly believes that mercury controls through these two methods are environmentally superior methods of control compared to add-on exhaust gas control devices (e.g., carbon injection) which have the potential to introduce waste byproducts, increase system inefficiencies (i.e., more energy per ton of product), consume additional raw materials that may degrade product quality, and provide possibly less effective control than the methods being pursued by SAC. While material substitution is an important part of SAC's plan to control mercury, SAC will rely mostly on effective removal of mercury via dust shuttling to control mercury below the required limit.

SAC Evaluation of Kiln (EU 003) Hg Emission Performance

SAC has collected data, since plant operations began, on total Hg mass inputs (assumed 100% emitted) for purposes of Title V permit compliance. The following figure (below on Page 3) shows the monthly total input of Hg (lb/mmton clinker) into the kiln system from January 2010 to December 2014. The data in Figure No. 1 displays three groups of data: the monthly values of Hg input and the 99-percent upper prediction limit (UPL) for the rolling 3-month and 12-month data sets, respectively. The NESHAP Hg emission limit, 5-year average of the Hg input, and the 3-month and 12-month UPL data are shown as different colored horizontal lines in the figure. Note that the UPL data were calculated after removing months of no production or zero Hg input into the system. Based on Florida Department of Environmental Protection (FDEP) and industry knowledge, SAC can assume that Hg input equals Hg emissions on a long-term basis. These monthly values are good indicators of the expected variation in the system regardless of method of measurement (NESHAP Hg limit of 55 lb/mmton clinker, 30-operating day average). Hence, SAC expects similar variations in the continuous emission monitoring (CEM) data on a long term basis.

As explanation of the applied statistical variability methodology used to determine expected necessary minimum Hg emission reductions for compliance, SAC offers the following explanation: SAC uses the UPL because it is a more accurate evaluation of data variability and thus, the potential for violation of the NESHAP standard (55 lb Hg per million ton clinker) when compared to the upper confidence limit (UCL). The UPL statistically determines the upper range value at which future values are likely to be above that value 1 percent of the time. In other words 1 out of 100 future values are expected to exceed this value. In contrast, the confidence limit predicts the upper and lower ranges with 99 percent statistical confidence that the average value of the current data set lies within that range. The UCL does not predict the potential for violation of the NESHAP standard.

Therefore, SAC determines based on the difference of the 12-month rolling data 99% UPL (147.3 lb/mmtonC) and the NESHAP standard (55 lb/mmtonC), SAC must be able to reduce Hg emissions 92.3 lb Hg/mmton C (i.e., reduction of 63 percent) to address data variability and meet the upcoming NESHAP standard. The reduction is even greater using the 3-month rolling data 99% UPL of 137.4 lb Hg/mmton C (i.e., reduction of 71 percent). In other words, SAC should expect to need to consistently reduce Hg emissions by at least 63 percent to address data variability and assure compliance to the NESHAP Hg standard. In practice, SAC believes that it needs to be able to reliably and consistently reduce Hg emissions by 75 percent to be in compliance with the NESHAP limit.

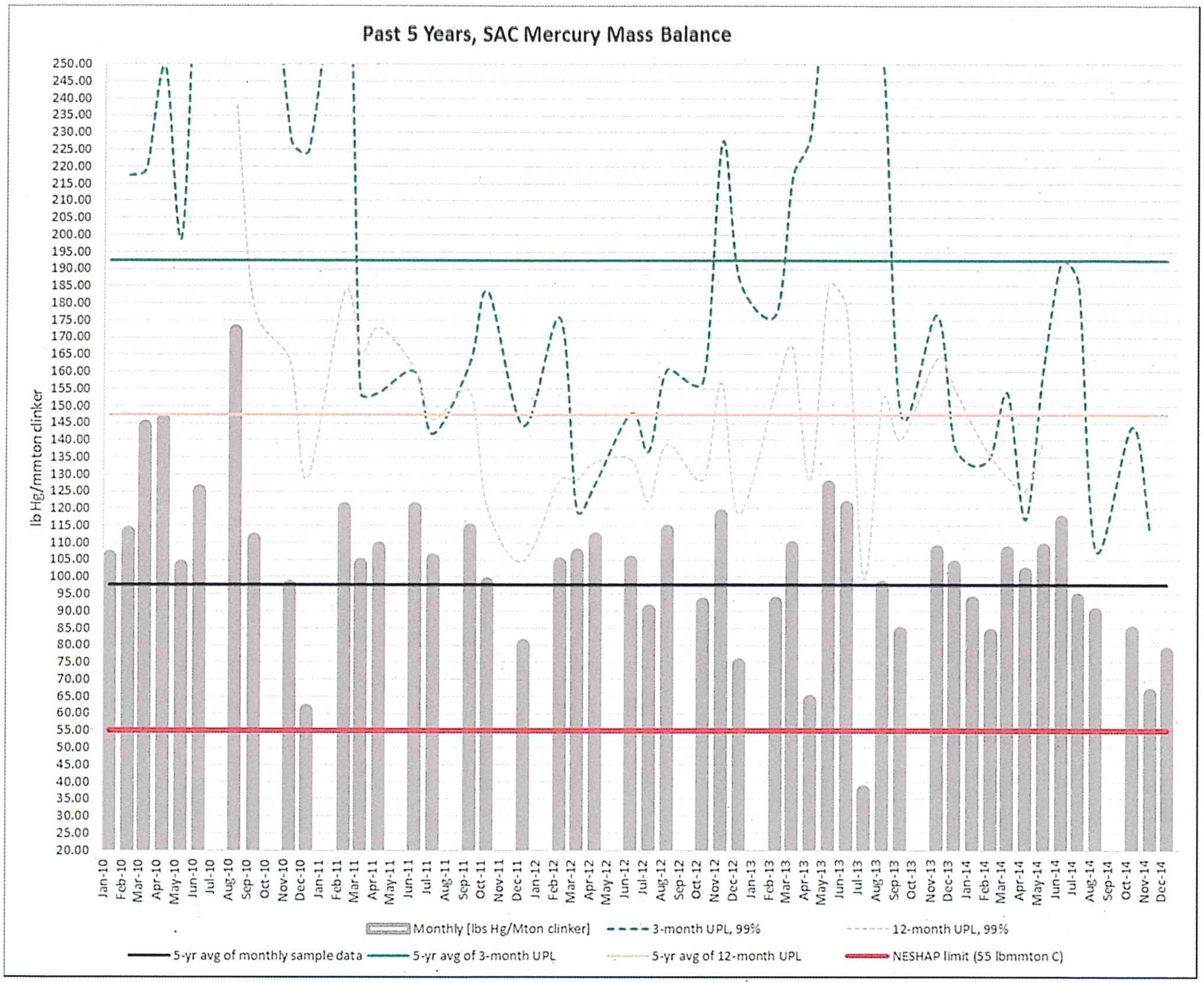

Figure 1: Past 5 years of monthly SAC mercury balance data and 3-month and 12-month rolling UPL variability statistics.

Satisfaction of 40 C.F.R. 63.6(i)

The provisions of 40 C.F.R. 63.6(i)(6)(i) require that a request for an extension of the compliance date include the following information.

The request for a compliance extension under paragraph (i)(4) of this section shall include the following information:

(A) A description of the controls to be installed to comply with the standard;

(B) A compliance schedule, including the date by which each step toward compliance will be reached. At a minimum, the list of dates shall include:

(1) The date by which on-site construction, installation of emission control equipment, or a process change is planned to be initiated; and

(2) The date by which final compliance is to be achieved.

(3) The date by which on-site construction, installation of emission control equipment, or a process change is to be completed; and

(4) The date by which final compliance is to be achieved.

SAC addresses each of these items below.

<u>40 CFR 63.(i)(6)(i)(A) - ***Controls to be Installed***</u>

(A) A description of the controls to be installed to comply with the standard;

Hg Control by Dust Shuttling

AC Permit No. 1210465-026-AC issued to SAC allowed for the construction, installation and implementation of a dust shuttle system to reduce mercury (Hg) emissions from the kiln system and capture it into the final product.

In March of 2013, SAC began seeking proposals, quotes, and engineering for its dust shuttle system. SAC hired FL Smidth and began preparing the engineering and plans for the dust shuttle system installation in 2014.

In May of 2013, SAC requested capital funding for the project and received capital funding in June of 2013 to cover project expenses 2013 through 2014. The project was broken out into two project phases that both required physical construction (see Figure 2 below).

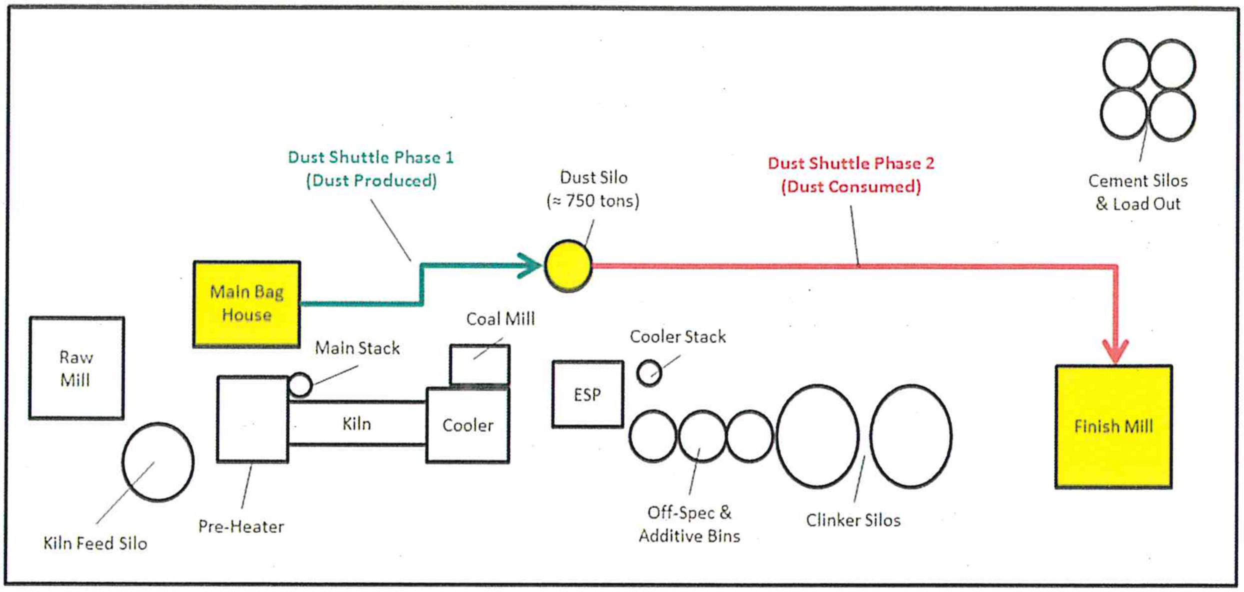

Figure 2: Displays Dust Shuttle Phase 1 & 2 in relation to the facility layout. Yellow highlighted equipment is part of the dust shuttle system.

Phase 1: The Phase 1 portion of the project re-commissioned the fly ash injection silo into the dust silo (approximately 750 ton capacity, depending on the variable density of bag house dust) and installed necessary piping, blowers, compressors, fans, and automation. for purposes of transporting dust from the main bag house to the dust silo. Phase 1 has been operational since January 2014 and completed construction October 2014. Phase 1 process is shown by the green line.

Phase 2: The Phase 2 portion of this project re-commissioned the existing fly ash injection Schenck Coriolis fly ash injection system and installed all necessary piping, blowers, compressors, fans, alleviators, automation etc. for purposes of transporting dust from the dust silo to the Finish Mill for use as a cement additive. Phase 2 began operation in October 2014. Phase II process is shown by the red line.

Note: It was possible to begin Phase 1 trials while Phase 2 was being constructed because the Dust Silo was initially empty and had enough capacity to hold extracted dust (750 tons) for a period of time until Phase 2 was operational.

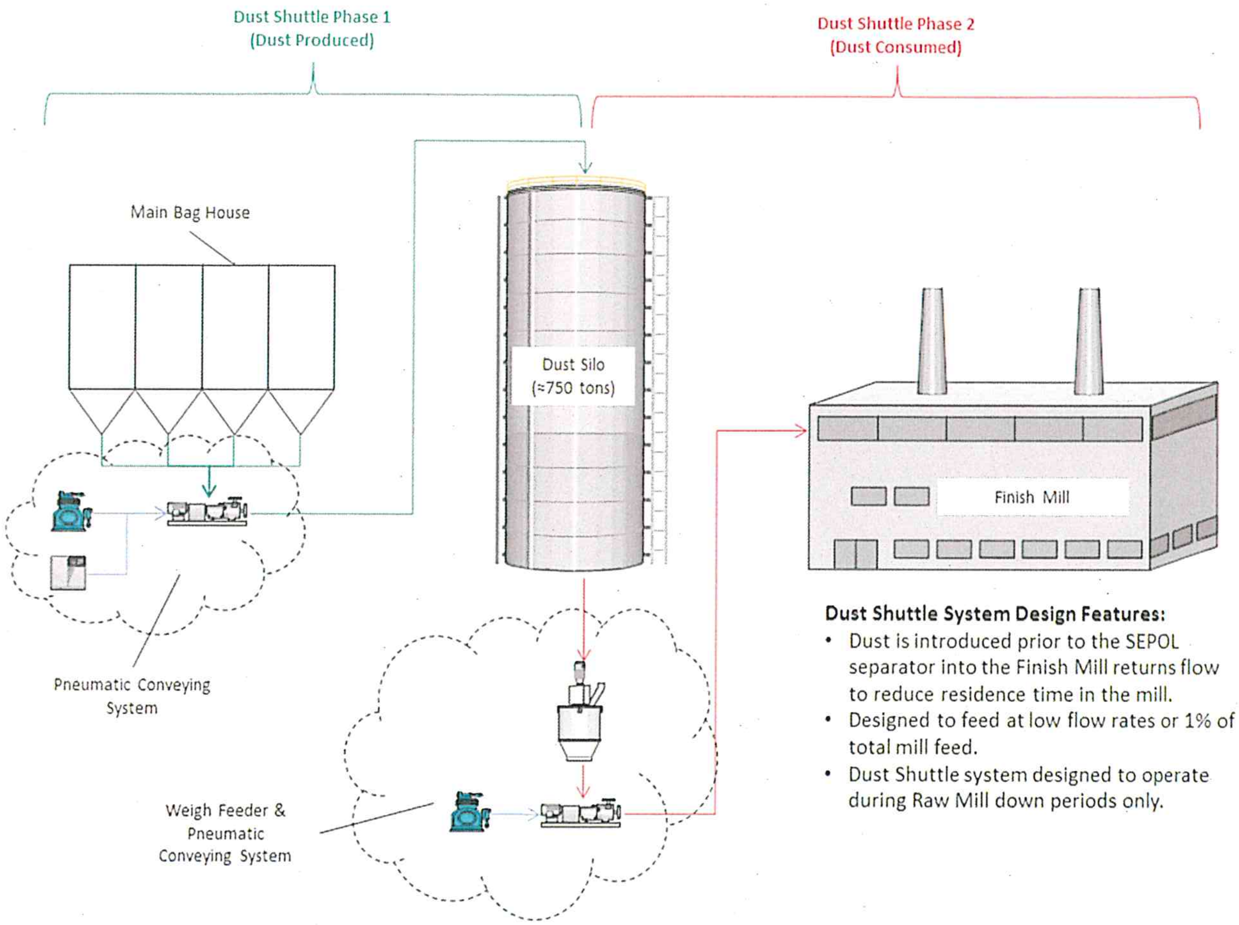

Figure 3: Displays SAC dust shuttle system main equipment and design features.

SAC designed the dust shuttle system to operate Phase 1 during raw mill down periods and to reintroduce the material back into the process (Phase2) at the Finish Mill, prior to the SEPOL separator, at one percent (1%) of ASTM Type I/II cement production. The decision to operate Phase 1 during raw mill down periods only was made for the following reasons: to target the dust material at its highest concentrations based on available information from the agency and industry, to possibly help improve clinker quality during raw mill down periods by reducing or eliminating the need to reintroduce bag house dust into the kiln feed; this in turn reduces air emissions of mercury during raw mill down periods. The decision to introduce at one percent (1%) of ASTM Type I/II cement production prior to the SEPOL separator was made for the following reasons: ASTM Type I/II is SAC's main product, this provides the greatest opportunity to reintroduce dust back into the system. One percent (1%) was chosen as the target because this is the acceptable limit for inorganic process additions per AASHTO M85/ASTM C 150 standards (without significant testing).

SAC believes that dust shuttling is effective at consistently reducing mercury emissions and controlling the variability of emissions. SAC understood that the quantity of dust shuttled at one percent (1%) of the mass of ASTM Type I/II production would be sufficient to lower mercury below the NESHAP limit. There was some thought that there could possibly be a multiplying affect; greater capture due to increases in available agglomeration sites caused by the removal of Hg. That presumed capture efficiency should provide ample control based on information presented in German language research studies (i.e., approximately 96% Hg emission reductions with just two percent (2%) of ESP dust removal had been demonstrated in German kiln systems).[1] As shown in Figure 4, based on 2014 dust shuttle performance, SAC does not see this level of Hg removal efficiency. For example, for the month of July 2014, SAC removed about 30 percent of the dust generated during Raw Mill down which was greater than 2 percent of total dust during the month. In contrast to the German research showing greater than 98 percent Hg removal, only about 50 percent Hg removal was observed in the month of July by comparing the input (by material balance) and the output by Hg CEMS. Furthermore, SAC found that if the Phase 1 portion of the dust shuttle process is not available during a raw mill down period at any time there could be a rapid and variable reversal of any Hg emission reduction gains. Since there is not sufficient data in the industry on the effectiveness of dust shuttling, SAC is not confident at this time as to how much dust removal is necessary to maintain compliance. It is promising, that for the first time, SAC achieved Hg emissions below the target limit for extended periods of time in 2014 (shown in Figure 4 below). However, SAC needs additional time to continue to perfect this method of control and will work towards optimizing the system in order to achieve its desired goal; compliance with the NESHAP standard.

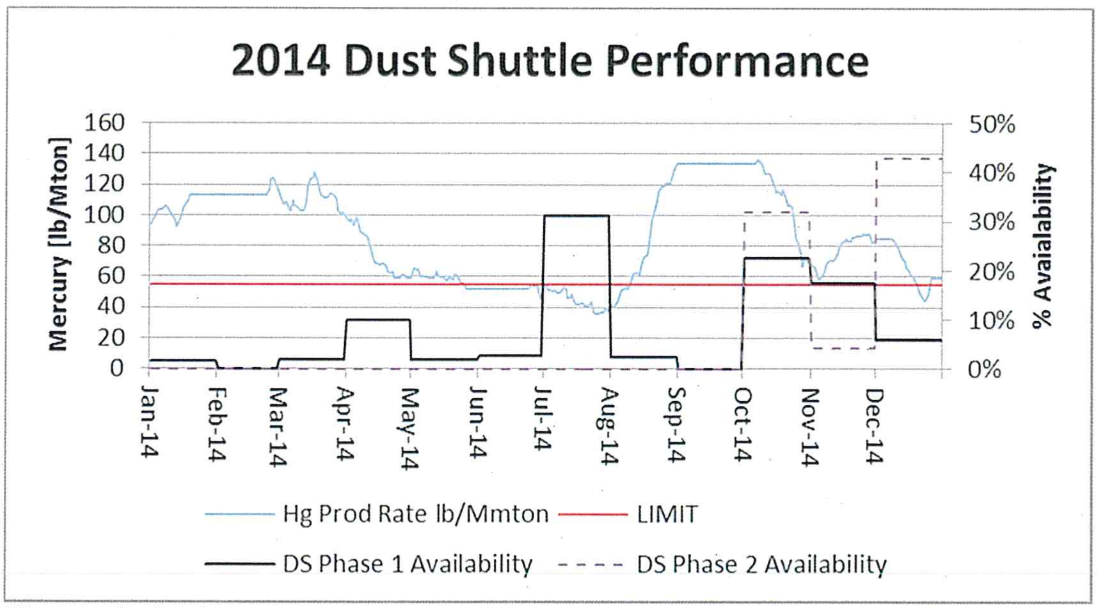

Figure 4: SAC Mercury as measured by CEM showing dust shuttle availability as defined below. During the periods June through early August and also a short period in December SAC achieved 30 day rolling average (blue line) below the 55 pounds per million tons of clinker (red line). The black line is monthly average Phase 1 availability. The purple dashed line is monthly average Phase 2 availability.

SAC is concerned that its initial estimates of dust removal and consumption up to 1% of ASTM Type I/II cement will not provide enough consumption of dust to allow for

1 Figure 7 from de Quervain, B., Ph.D., "Umweltfreundliche Klarschlammverbrunnung am Beispiel des PCW Portand-Cement-Werks," GWA des Schweizerichen Vereins des Gas und Wasserfaches, 1992, Sonderdruck No. 1258.

enough dust removal (Phase 1). Since the silo has filled up, SAC often cannot operate or can only operate Phase 1 of the dust shuttle system for short periods during raw mill down time before filling up the Dust Silo. SAC now believes that it will be necessary at times to exceed one percent (1%) addition of dust into the cement product in order to manage dust inventories properly and achieve higher Phase 1 availability. SAC defines and calculates Phase 1 & Phase 2 availability as follows:

$$A_1 = \frac{D_1}{R}$$

A_1 = Phase 1 System Availability [%]
D_1 = Phase 1 Dust Transfer Run Time [minutes]
R = Raw Mill Down Time [minutes]

$$A_2 = \frac{D_2}{0.01\ x\ F_{Type\ I/II}}$$

A_2 = Phase 2 System Availability [%]
D_2 = Phase 2 Dust Transferred [tons]
$F_{Type\ I/II}$ = Finish Mill Type I/II Production [tons]

Note: A_2 is limited by ASTM std. M 327

SAC completed construction of Phase 1 & 2 of the dust shuttle system in 2014 and achieved the following Phase 1 & 2 monthly average system availabilities displayed in Table 1 (below).

Table 1: 2014 Phase 1 & 2 System Availability.

	Phase 1 Availability	Phase 2 Availability
Phase I operational start		
Jan-14	1.4%	0.0%
Feb-14	0.0%	0.0%
Mar-14	2.0%	0.0%
Apr-14	9.9%	0.0%
May-14	1.9%	0.0%
Jun-14	2.6%	0.0%
Jul-14	31.2%	0.0%
Aug-14	2.3%	0.0%
Sep-14	0.0%	0.0%
Phase II operational start		
Oct-14	22.6%	32.0%
Nov-14	17.3%	4.4%
Dec-14	5.8%	42.9%

The primary reason for a drop off in Phase 1 Dust Shuttle Availability during August 2014 and December 2014 was due to the fact that the transfer silo filled up completely and only limited Phase 1 operation could occur. The drop off in November 2014 for Phase 2 was due to modifications and efforts to improve performance.

In order to increase Phase 1 & 2 system availability and achieve adequate Hg removal, SAC has to be able to add more than one percent (1%) to the cement (AASHTO M85-11 5.1.4). In order to increase use of dust as a cement additive, SAC will have to perform additional material sampling and testing to demonstrate that a higher input of dust to the finish mill will still meet the requirements of AASHTO M327 & ASTM C465 requirements for inorganic process additions in the amount used or greater.

Table 2 (below) estimates the expected quantity of dust removal on an annual average basis necessary based on SAC historic mass balance data (annual for last 5 years) in order to achieve a 63% reduction. While SAC targets 75%, a 63% reduction is applied for demonstration purposes. The table then provides calculation of the necessary percent dust addition to cement in order to maintain a balanced inventory. Based on these calculations an annual average long term cement addition would range from 1.51 to 2.81%. Noting that these calculations are based on annual average data, the variability expected in a 30-operating day average should be expected to be greater causing a greater restriction on inventory balancing. The variability of the data is a critical unknown that SAC must address through further testing.

Table 2: Displays the estimated quantity of dust necessary to achieve 63% reduction and subsequent necessary percent addition to maintain a balanced inventory. The purpose of this table is primarily to demonstrate that it is necessary to achieve greater than one percent (1 %) addition in order to achieve at least 63% mercury removal and maintain a balanced inventory.

Assumptions:

Stage 4 Cyclone Efficiency: 88%
Target Hg Reduction: 63%
BH Dust Concentration: 8 x average kiln feed conc.

Estimated BH Dust Shuttle Inventory Change By Year & Required Percent Replacement

Year	Mercury Mass Balance [lbs]	Target Hg Reduction [lbs]	Average Kiln Feed Hg Conc. mg/Kg	Raw Mill Down Time [hrs]	Average Kiln Feed [tons/hr]	Required Dust Removal for 63% Reduction [tons]	ASTM Type I/II Cement Produced [tons]	**% Dust Addition to Achieve Balanced Inventory [%]**
2014	50.4	-31.8	0.227	656	157	8756	506,232	**1.73%**
2013	46.5	-29.3	0.138	627	155	13238	470,846	**2.81%**
2012	39.9	-25.1	0.227	532	151	6906	384,505	**1.80%**
2011	34.6	-21.8	0.272	351	152	5018	320,293	**1.57%**
2010	50.7	-31.9	0.350	1214	150	5690	375,830	**1.51%**

40 CFR 63.(i)(6)(i)(B) - ***Compliance Schedule***

(B) A compliance schedule, including the date by which each step toward compliance will be reached. At a minimum, the list of dates shall include:

(1) The date by which on-site construction, installation of emission control equipment, or a process change is planned to be initiated; and

As noted above, SAC only produces ASTM Type I/II and Type III cement. Unlike other cement product (e.g., masonry cement) that can have dust input as high as ten percent (10 %) or more; Type I/ II cement has product quality constraints that constrain the amount of allowable process additions. Type I/II process additions are limited based ASTM & AASHTO specifications. ASTM Types I/II cement are limited to one percent (1%) cement additions per AASHTO M85-11, Section 5.1.4 which states;

Inorganic Processing Additions – The amount shall not be more than 5.0 percent by mass of cement. Not more than one inorganic processing addition shall be used at a time. For amounts greater than 1 percent, they shall have been shown to meet the requirements of AASHTO M 327 for inorganic processing additions in the amount used or greater.

The underlined statement is critical and requires that SAC obtain a case specific allowance under AASHTO M85/ASTM C 150. The expected time necessary to receive such a case specific allowance is expected to be at least 12 months. Until SAC can demonstrate amounts greater than one percent (1%) can meet AASHTO M327 product standard requirements, SAC is limited to one percent (1%) addition.

A detailed schedule is provided in Attachment 1. It lays out the planned date(s) for each of the necessary steps that have to be completed prior to making the process change of increasing the amount of process addition of dust to two percent (2%) or greater, and also the expected time to realize the mercury emission reductions after the change is made.

(4) The date by which final compliance is to be achieved.

The date by which final compliance is to be achieved is September 9, 2016.

Conclusion

SAC believes that its current means of Hg control are viable means to compliance with the upcoming limit of 55 lb/mmton clinker established under the PCMACT. SAC believes that to assure continuous compliance more time is needed to complete implementation and perfection of the above described control strategy and to make the necessary process changes that will enable greater than one percent (1%) cement addition of bag house dust. Therefore, SAC requests an extension until September 9, 2016.

Please contact me if you have any questions. Thank you for your time and we look forward to working with you and your staff on this request.

Sincerely,

Tom Messer
Branford Cement Plant Manager

ec: Krishna C. Cole, SAC Environmental Manager krishnac@vcsmc.com
David Read, Florida DEP DARM, david.read@dep.state.fl.us
Richard Rachal, Florida DEP NE District, Richard.Rachal@dep.state.fl.us
Hastings Read, Florida DEP DARM, hastings.read@dep.state.fl.us
Max Lee, Koogler and Associates, Inc., mlee@kooglerassociates.com

Attachment 1: Expected timeline to make the necessary process changes to increase cement addition of dust to greater than one percent (1%) and the necessary time to realize the impact on mercury emissions as mercury in the system is reduced.

Task	Start	End	Days	3/2/2015	3/9/2015	3/30/2015	4/6/2015	4/13/2015	4/27/2015	5/4/2015	5/11/2015	5/18/2015	5/25/2015	6/15/2015	6/22/2015	6/29/2015	7/6/2015	7/13/2015	7/20/2015	10/12/2015	10/19/2015	11/23/2015	11/30/2015	1/18/2016	1/25/2016	9/9/2016
Develop ASTM C 465 Protocol	3/2/2015	3/30/2015	28	X	→	X																				
Set Up Project w/ External Lab	3/30/2015	4/27/2015	28			X	→	→	X																	
Gather Samples	4/6/2015	5/4/2015	28				X	→	→	X																
Ship Samples	5/4/2015	5/11/2015	7							X	X															
Analyze Samples	5/11/2015	5/18/2015	7								X	X														
Obtain/Review Results	5/18/2015	6/15/2015	28									X	→	X												
Ship Retained Sample To Detroit	6/15/2015	6/29/2015	14											X	→	X										
Put up concrete mix/batch and specimens	6/29/2015	7/13/2015	14													X	→	X								
Age Concrete	7/13/2015	10/12/2015	91															X	→	X						
Data Analysis	10/12/2015	11/23/2015	42																	X	→	X				
Sales/Marketing Communication	11/23/2015	1/18/2016	56																			X	→	X		
Begin using > 1% in Production (if allowed)	1/18/2016	1/25/2016	7																					X		
Increase Dust Shuttle Availability	1/18/2016	9/9/2016	235																					X	→	X