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October 16, 2015

VIA HAND DELIVERY and ELECTRONIC MAIL

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Office of the Administrator
U.S. Environmental Protection Agency
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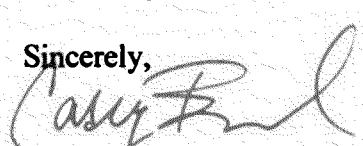
Ms. Tina Ndoh
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Re: Petition for Reconsideration and Request to Stay "Phosphoric Acid Manufacturing and Phosphate Fertilizer Production RTR and Standards of Performance for Phosphate Processing; Final Rule," 80 Fed. Reg. 50,386 (Aug. 19, 2015) (EPA Docket ID No. EPA-HQ-OAR-2012-0522)

Dear Administrator McCarthy,

PCS Phosphate Company, Inc.; White Springs Agricultural Chemical, Inc., d/b/a PCS Phosphate-White Springs; and PCS Nitrogen Fertilizer, L.P., (collectively "PCS") respectfully submit this Petition for Reconsideration and Request for Administrative Stay of the above-referenced Final Rule. In this Petition, PCS fully supports and incorporates the grounds for reconsideration and stay presented in the Petition submitted by The Fertilizer Institute ("TFI"). PCS is submitting this Petition to additionally seek reconsideration and stay based on grounds that are unique to PCS facilities. Please contact me with any questions on this Petition.

Sincerely,



Casey Fernung Bradford
Counsel for PCS
(404) 581-8119

cc: Jonathan Averbach, Esq. (EPA)
Susan Fairchild (EPA)
(via electronic mail)

BEFORE THE UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY

PCS PHOSPHATE COMPANY, INC.; **WHITE SPRINGS AGRICULTURAL CHEMICALS, INC., d/b/a PCS PHOSPHATE-WHITE SPRINGS;** **and** **PCS NITROGEN FERTILIZER, L.P.** **Petitioners**	**EPA Docket #:** **EPA-HQ-OAR-2012-0522**

PETITION FOR RECONSIDERATION AND REQUEST FOR ADMINISTRATIVE STAY

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PETITION FOR RECONSIDERATION
AND REQUEST FOR ADMINISTRATIVE STAY

Pursuant to Clean Air Act Section 307(d)(7)(B), 42 U.S.C. § 7607(d)(7)(B), and the Administrative Procedure Act, 5 U.S.C. §§ 553(e), 705, PCS Phosphate Company, Inc.; White Springs Agricultural Chemicals, Inc. d/b/a PCS Phosphate-White Springs; and PCS Nitrogen Fertilizer, L.P. (together referred to herein as "PCS") respectfully submit this petition (hereinafter "Petition") to the U.S. Environmental Protection Agency ("EPA") for reconsideration and an immediate administrative stay of the "Phosphoric Acid Manufacturing and Phosphate Fertilizer Production RTR and Standards of Performance for Phosphate Processing; Final Rule." 80 Fed. Reg. 50,386 (Aug. 19, 2015) ("Final Rule") (Dkt. No. EPA-HQ-OAR-2012-0522).

Reconsideration is warranted because in adopting the Final Rule, EPA made a number of substantial and unforeseeable, substantive changes to the National Emission Standards for Hazardous Air Pollutants ("NESHAPs") for phosphoric acid manufacturing and phosphate fertilizer production under 40 C.F.R. Part 63, Subparts AA and BB, without allowing an opportunity for meaningful public comment before the changes were adopted in the Final Rule. Many of these changes, which became effective immediately upon publication of the Final Rule without any implementation period, are described in the Petition for Reconsideration and Request to Stay submitted by The Fertilizer Institute (the "TFI Petition"). PCS hereby adopts and fully incorporates by reference the grounds for reconsideration and stay presented in the TFI Petition.

In this Petition, PCS is also requesting that EPA reconsider the Final Rule based on two grounds that are unique to PCS. First, PCS Phosphate Company, Inc. ("PCS Phosphate") owns and operates the only existing phosphate rock calciners subject to the new total fluoride emission

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limit for calciners in the Final Rule. Emissions data collected by PCS Phosphate demonstrate that the total fluoride limit is not achievable during a representative range of operating conditions which can occur with the PCS Phosphate calciners. Second, the requirement in the Final Rule for liquid-to-gas ratio monitoring of absorbers that operate with a pressure drop of less than five inches of water column ("low-energy absorbers") presents unique technical challenges for PCS facilities. It was simply impossible for PCS to comply with this requirement on August 19, 2015 as required by the Final Rule. Section 307(d)(7)(B) of the Clean Air Act requires EPA to grant reconsideration of these requirements because the grounds for objection arose after the close of the public comment period, were not logical outgrowths of any proposed rulemaking, were impracticable for PCS to raise in comments, and are of central relevance to the Final Rule.

PCS will be filing a Petition for Judicial Review of the Final Rule in the United States Court of Appeals for the District of Columbia Circuit to preserve its right to seek judicial review within the time frame specified by Clean Air Act Section 307(d)(7)(B). PCS hopes that EPA will grant this Petition for administrative reconsideration and then move jointly with PCS to request that the Court hold the litigation in abeyance during the reconsideration process.

In addition to seeking reconsideration, PCS is requesting that EPA administratively stay the Final Rule or agree to a judicial stay pending the outcome of reconsideration. A stay is warranted to avoid subjecting PCS and other regulated entities to substantial costs and legal concerns as a result of the technical and legal errors in the Final Rule pending reconsideration or judicial review.

INTRODUCTION AND BACKGROUND

I. The PCS Facilities

PCS owns and operates manufacturing facilities subject to 40 C.F.R. Part 63, Subparts AA and BB, in Aurora, North Carolina; White Springs, Florida; and Geismar, Louisiana. These

facilities include wet process phosphoric acid, superphosphoric acid, purified phosphoric acid, and diammonium and monoammonium phosphate process lines. As mentioned, the PCS Phosphate facility in Aurora also includes the only existing phosphate rock calciners subject to the Final Rule. PCS participated in EPA's information collection process for this rulemaking and submitted extensive comments to EPA during the proposed rule stage. All three PCS facilities will face noncompliance and liability risks and will incur substantial costs in the near future unless EPA grants reconsideration and stays the Final Rule. PCS therefore has a substantial interest in the Final Rule and the quality of the public comment process that is the basis for the Final Rule.

II. The EPA Rulemaking at Issue

Section 112(f) of the Clean Air Act requires EPA to review the NESHAPs every eight years and to revise those standards as necessary to address any risk remaining to human health and the environment. Under Section 112(d)(6) of the Clean Air Act, EPA is also required to revise the Maximum Achievable Control Technology ("MACT") standards in the NESHAPs "as necessary (taking into account developments in practices, processes, and control technologies)." Together, these two processes are commonly known as a "residual risk and technology review."

EPA issued two rounds of information requests under Section 114 of the Clean Air Act to inform its review of Subparts AA and BB. In 2010, PCS conducted total fluoride testing concurrent with hydrogen fluoride testing in response to an EPA request. In early 2014, EPA required additional testing of emissions from several process lines at the PCS facilities, including additional testing of hydrogen fluoride emissions from phosphate rock calciners. PCS conducted the required testing of hydrogen fluorides in response to the 2014 request and submitted the resulting data to EPA. PCS also voluntarily conducted concurrent testing of total fluoride

emissions from the calciners in 2014 to address its concerns about the accuracy and reliability of the methodology for hydrogen fluoride testing.

On November 7, 2014, EPA issued a proposed rule to revise Subparts AA and BB based on its residual risk and technology review. 79 Fed. Reg. 66,512 (Nov. 7, 2014) ("Proposed Rule"). EPA found that the existing standards in Subparts AA and BB were already amply protective of human health and the environment, and that additional standards were not appropriate based on a review of technology. *Id.* at 66,538-39, 66,549-50; *see also* 80 Fed. Reg. at 50,390-91, 50,393 (finalizing EPA's conclusion that no additional requirements were necessary based on risk or changes in technology). Nevertheless, EPA proposed several new requirements under Subparts AA and BB, including a new work practice standard for hydrogen fluoride emissions from phosphate rock calciners.[1] 79 Fed. Reg. at 66,534-35, 66,566 (proposed 40 C.F.R. § 63.602(a)(2)(iii)). EPA also proposed several options for monitoring and operating requirements at low-energy absorbers. The Proposed Rule would have required low-energy absorbers to monitor either influent liquid flow or liquid-to-gas ratio, and either exit gas temperature and inlet liquid pressure or temperature differential. 79 Fed. Reg. at 66,575 (proposed 40 C.F.R. Part 63, Subpart AA, Table 3).

PCS provided EPA with timely comments on the Proposed Rule. *See* 79 Fed. Reg. 73,872 (Dec. 12, 2014) (extending the public comment period to January 21, 2015); "Comments on the U.S. Environmental Protection Agency's Proposed Rule Entitled 'Phosphoric Acid

[1] For some affected facilities, EPA also proposed numeric hydrogen fluoride emissions limits and requested comment on an alternative compliance option whereby those facilities could have demonstrated compliance with their existing numeric limits on total fluoride emissions. 79 Fed. Reg. at 66,546, 66,557, 66,573-74 (proposed 40 C.F.R. Part 63, Subpart AA, Tables 1 - 2A), 66,586 (proposed 40 C.F.R. Part 63, Subpart BB, Tables 1 - 2). Phosphate rock calciners, however, were not already subject to any numeric limit on total fluoride emissions under existing regulations at the time of the Proposed Rule. Nor did EPA propose or request comment on any numeric limit for either total fluoride or hydrogen fluoride emissions from calciners in the Proposed Rule.

Manufacturing and Phosphate Fertilizer Production RTR and Standards of Performance for Phosphate Processing'" (Dkt. ID No. EPA -HQ-OAR-2012-0522-0037) ("PCS Comments" submitted January 21, 2015). The PCS Comments included a statement of support for the work practice standard that EPA proposed for phosphate rock calciners. PCS Comments at 6 (Dkt ID No. EPA-HQ-OAR-2012-0522-0037).

The Final Rule, issued August 19, 2015, departs significantly from the Proposed Rule in terms of its requirements for both calciners and low-energy absorbers. Although EPA proposed a work practice standard for calciners and did not propose or request comment on any numeric fluoride emission limit for calciners, the Final Rule sets a MACT floor limit of 0.0009 lb of total fluoride per ton of rock feed (lb/ton) for existing calciners such as PCS's. 80 Fed. Reg. at 50,401, 50,445 (40 C.F.R. Part 63, Subpart AA, Table 1). EPA promulgated this limit without the benefit of the test data that PCS collected in April 2014, showing that total fluoride emissions from the Aurora calciners exceeded 0.0009 lb/ton during three out of four test runs in 2014. With respect to low-energy absorbers, the Final Rule differs from the Proposed Rule because it establishes liquid-to-gas ratios as the *only* allowed parameter for monitoring and operating requirements. *Id.* at 50, 336, 50,457 (40 C.F.R. Part 63, Subpart AA, Table 3, and Subpart BB, Table 3), These new requirements for calciners and low-energy absorbers became effective immediately upon publication of the Final Rule in the *Federal Register* on August 19, 2015. *Id.* at 50,386 ("This final action is effective on August 19, 2015.").

ARGUMENT

The Clean Air Act requires the Administrator of EPA to convene a reconsideration proceeding if "it was impracticable to raise [an] objection" to a final EPA action within the time for public comment or if "the grounds for such objection arose after the period for public comment (but within the time specified for judicial review)" and such objection is "of central

relevance to the outcome of the rule." 42 U.S.C. § 7607(d)(7)(B). These criteria for granting reconsideration are satisfied here, where EPA promulgated an unachievable numeric limit on total fluoride emissions from the Aurora calciners without proposing or requesting comment on the possibility of any such limit. Reconsideration is also necessary because EPA revised the monitoring and operating requirements for low-energy absorbers without explaining its rationale until after the close of the comment period and without addressing various technical challenges to compliance.

At the same time, the Administrative Procedure Act and Clean Air Act grant EPA authority to stay the Final Rule. *See* 5 U.S.C. § 705 ("When an agency finds that justice so requires, it may postpone the effective date of action taken by it, pending judicial review . . . ."); 42 U.S.C. § 7607(d)(7)(B) ("The effectiveness of the rule may be stayed pending such reconsideration . . . ."). Considering the numerous technical and legal errors raised in this Petition and the TFI Petition, justice requires that EPA stay the Final Rule and take any other steps that are necessary to defer compliance deadlines or other requirements of the Final Rule pending the outcome of a reconsideration proceeding and/or judicial review.

I. EPA Should Reconsider the Total Fluoride Emissions Limits for New and Existing Phosphate Rock Calciners

The total fluoride limit for calciners in the Final Rule is based on data collected from just three test runs of Method 13B at a PCS calciner in response to EPA's 2010 information request. 80 Fed. Reg. at 50,400 . EPA must reconsider the total fluorides limit because 2014 test data for that same calciner demonstrate that the total fluoride limit in the Final Rule does not meet the definition of a MACT floor limit, does not adequately account for variability in total fluoride emissions from calciners at different points in time, and is not achievable at the PCS Aurora calciners during a representative range of operating conditions for such calciners.

Section 112(d)(3) of the Clean Air Act defines the MACT floor as the average level of emissions achieved by the best performing five sources when there are fewer than 30 sources in the relevant source category. PCS Phosphate owns and operates the only six existing phosphate rock calciners in the Subpart AA source category. Therefore, the MACT floor for existing calciners is defined as the average emissions limitation achieved by the PCS Aurora calciners. EPA has acknowledged that all six calciners in Aurora are identical, such that data from one calciner is representative of emissions from the others during the same test event. 80 Fed. Reg. at 50,400 ("In response to the April 2010 CAA section 114 request, the facility provided EPA Method 13B total fluoride emission testing results for one of their six identical phosphate rock calciners. We conclude that the total fluoride emission rate achieved by this phosphate rock calciner characterizes the emissions from all six calciners and thus this emission rate was used to determine the MACT floor for total F emissions."); *see also* 67 Fed. Reg. 40,814, 40,815 (June 13, 2002) (explaining that all six calciners in Aurora are identical).

The total fluoride data that PCS collected in April 2014 was taken from the same calciner (EP-203) using the same methodology (Method 13B) as the 2010 data that EPA used to set the limit in the Final Rule. As shown in Table 1 of this Petition, the results of three out of four individual test runs of Method 13B in April 2014 exceeded the total fluoride limit for calciners in the Final Rule. Table 2 in this Petition shows that any three-run average from 2014 also exceeds the total fluoride limit in the Final Rule. *See also* Attachment A, URS Summary Letter Report for Calciner Emissions Testing, at Table 3 (April 29, 2014); Attachment B, URS Report, EPA Information Collection Request Emissions Testing, PCS Phosphate Company, Inc. – Aurora, NC, at Table 3-1, Appendix A-1-6 (Nov. 2010).

Table 1:
Method 13B Stack Test Results & Feed Rates for Calciner EP-203
PCS Phosphate – Aurora, North Carolina

Run Date	Run Number	Phosphate Ore Mass Flow Rate to Calciner (tons/hr)	Pounds of Total Fluoride Per Ton of Phosphate Ore Feed (lb/ton)
8/3/2010	1	89.5	0.00045
8/3/2010	2	65.5	0.00057
8/3/2010	3	91.0	0.00036
4/4/2014	1	61.1	**0.00172**
4/4/2014	2	51.9	**0.00250**
4/4/2014	3	36.2	0.00083
4/4/2014	4	20.4	**0.00121**

Table 2:
Three-Run Average Test Results from Method 13B Stack Testing on April 4, 2014
PCS Phosphate – Aurora, North Carolina

Test Runs	Phosphate Ore Mass Flow Rate to Calciner (tons/hr)	Three-Run Average	Exceeds Limit of 0.0009 lb/ton?
2010	82	0.00046	No
2014 (Runs 1, 2, 3)	49.7	0.00168	Yes
2014 (Runs 1, 2, 4)	44.5	0.00181	Yes
2014 (Runs 1, 3, 4)	39.2	0.00125	Yes
2014 (Runs 2, 3, 4)	36.2	0.00151	Yes

Variability in total fluoride emissions from the calciners over time is caused by differences in process operating conditions. For example, the average feed rate to Calciner EP-

203 during the 2014 testing was approximately 42 tons/hour, compared to approximately 80 tons/hour during the 2010 testing. Rock production at the mine during the 2014 testing was constrained by difficult geological conditions, which in turn required a lower rate of feed to the calciners. Because each calciner is a constant-volume piece of equipment, lower feed rates have the effect of increasing the residence time of the feed inside the calciner and, therefore, the potential for total fluoride emissions. Other process operating conditions (for example, moisture content) may contribute to emissions variability. PCS is continuing to collect and evaluate operating data for the periods of total fluoride testing and will supplement this Petition based on the results of its review.

To demonstrate compliance with the new total fluorides limit, the Final Rule requires performance testing during "representative" operating conditions, which are defined as a "range" of process and control measure conditions "under which the facility expects to operate (regardless of the frequency of the conditions)" and that are "likely to most challenge the emissions control measures of the facility." 80 Fed. Reg. at 50,453 (40 C.F.R. § 63.626(d)(1)). The total fluorides emissions testing in April 2014 was conducted during representative operating conditions for the calciners. The 2014 emissions data demonstrate that EPA's total fluoride limit for calciners is not achievable during representative operating conditions and must be revised to account for the 2014 test data.

Because EPA failed to propose or request comment on the possibility of a numeric limit on fluoride emissions from calciners, the grounds for this objection arose after the close of the comment period for the Proposed Rule. Furthermore, EPA's promulgation of a numeric limit for total fluorides is not a logical outgrowth of a proposal to establish a work practice standard for hydrogen fluorides. It would have been impracticable for PCS to provide meaningful comments

on the appropriate level of a total fluoride limit which was never even mentioned by EPA in the Proposed Rule. *See Envtl. Integrity Project v. EPA*, 425 F.3d 992, 996 (D.C. Cir. 2005) (explaining that the logical outgrowth doctrine does not apply "where interested parties would have to 'divine [the agency's] unspoken thoughts'") (quoting *Arizona Pub. Serv. Co. v. EPA*, 211 F.3d 1280, 1299 (D.C. Cir. 2000)). EPA is required to grant reconsideration of the total fluorides limit for phosphate rock calciners under these circumstances.

II. EPA Should Reconsider the Parametric Monitoring and Operating Requirements for Low-Energy Absorbers.

As explained previously, PCS supports and incorporates the grounds for reconsideration set forth in TFI's Petition, including TFI's concerns with the new liquid-to-gas ratio monitoring and operating requirements for low-energy absorbers. PCS also presents the following grounds for reconsideration that are unique to the PCS facilities.

PCS operates at least 11 low-energy absorbers subject to the NESHAPs in Aurora, NC; six in Geismar, Louisiana; and three in White Springs, Florida. For many years now, PCS has monitored and recorded influent liquid flow rate and pressure drop information for low-energy absorbers under Subparts AA and BB. *See* 40 C.F.R. §§ 63.605(c), .625(c) (2002 – 2014). PCS continues to believe that monitoring pressure drop remains appropriate for some low-energy absorbers in order to ensure proper operation of the unit.

Nevertheless, in the Final Rule, EPA for the first time asserts that "pressure drop is not integral to the mechanism used in [a low-energy] absorber to mix the scrubbing liquid and inlet gas." 80 Fed. Reg. at 50,418. EPA's support for this statement is found in a Technical Memorandum that was added to the rulemaking docket after the close of the comment period. "Use of Pressure Drop as an Operating Parameter," (Dkt. ID No. EPA-HQ-OAR-2012-0522-0077) (uploaded to the docket on August 19, 2015) ("Technical Memo"). PCS believes,

however, that the Technical Memo fails to account for relevant differences among low-energy absorbers and, instead, focuses on solids particulate loading in low-energy absorbers. *See id.* at 1 (asserting that pressure drop is not a parameter of interest in low-energy absorbers "because it is not directly related to the effectiveness of particle capture"). The Technical Memo fails to address certain low-energy absorbers at some PCS facilities that have different mechanisms for pollutant capture; for example, crossflow absorbers that utilize a mesh pad to promote contact, or liquid-to-gas absorbers where the gas is also absorbed into a liquid such that the inertial impact portion of the capture mechanism is not as dominant. Reconsideration is necessary to allow an opportunity for public comment on technical issues related to EPA's rationale for eliminating pressure drop as an acceptable parameter for low-energy absorbers.

EPA also should reconsider the requirement for liquid-to-gas ratio monitoring as the only option for parametric monitoring of low-energy absorbers. 80 Fed. Reg. at 50,446 (40 C.F.R. Part 63, Subpart AA, Table 3), 50,457 (40 C.F.R. Part 63, Subpart BB, Table 3). Unlike the Final Rule, the Proposed Rule would have allowed other options, besides a liquid-to-gas ratio, for low-energy absorbers. *See, e.g.*, 79 Fed. Reg. at 66,575 (proposed 40 C.F.R. Part 63, Subpart AA, Table 3). The switch to require liquid-to-gas ratio monitoring only is not a "logical outgrowth" of the Proposed Rule and has a significant negative impact on PCS facilities, especially in light of the immediate effective date of this requirement.

None of the low-energy absorbers at PCS facilities are capable of complying with the new requirement for immediate liquid-to-gas ratio monitoring, because none of the absorbers in question have gas influent monitoring equipment. Installing the requisite monitors on the influent side of these absorbers will take time (at a minimum, a year to order and install equipment) and will present technical challenges that EPA has not allowed facilities an

opportunity to evaluate and address in comments. Indeed, at some units, PCS does not know if it is even technically feasible to install such meters. EPA must allow a meaningful opportunity for comment on the technical challenges and cost of gas flow monitoring equipment.

Although the Final Rule includes an option to utilize design blower capacity "with appropriate adjustments for pressure drop" instead of installing gas flow monitors, it was not possible for PCS to achieve compliance with this option immediately on August 19, 2015 as required by the Final Rule. 80 Fed. Reg. at 50,446 (40 C.F.R. Part 63, Subpart AA, Table 3), 50,457 (40 C.F.R. Part 63, Subpart BB, Table 3). Achieving compliance on August 19, 2015 would have required an impossible, instantaneous change in monitoring procedures at the PCS facilities. Furthermore, determining gas flow based on design blower capacity raises a number of technical questions that are not addressed in the Final Rule and that will require time for PCS to resolve. For example, it is not clear what EPA means by "appropriate adjustments for pressure drop." Nor is it clear how gas flow should be determined in cases where multiple absorbers share a single fan or blower, or where one absorber has multiple fans or blowers.

As another example, three low-energy absorbers at the PCS Phosphate facility in Aurora, North Carolina do not have any fans or blowers and therefore cannot comply with the option to utilize design blower capacity. In conversations with PCS after the Final Rule was issued, EPA has suggested that PCS should request EPA's approval of an Alternative Monitoring Plan under 40 C.F.R. § 63.8(f) for these three low-energy absorbers. EPA's suggestion does not provide a reasonable path to compliance with the Final Rule. Requesting and obtaining EPA approval of an Alternative Monitoring Plan is a lengthy and complicated process. EPA's suggestion would create an unavoidable compliance problem for PCS facilities between the effective date of the Final Rule and an undetermined, future date of EPA approval of an Alternative Monitoring Plan,

which EPA would have discretion to approve or not. A rulemaking with notice and public comment is the appropriate mechanism for gathering information on feasible and economical methods of monitoring control device parameters. EPA should grant reconsideration to allow for public comment on both the appropriate methods of determining gas flow and the amount of time required to begin implementing liquid-to-gas ratio monitoring.

III. EPA Should Stay the Final Rule Pending Reconsideration of the Issues Addressed in This Petition.

In the Final Rule, EPA introduced new and unprecedented regulatory changes that create substantial costs and legal uncertainties for PCS facilities under Subparts AA and BB. PCS has been working diligently since the Final Rule was issued to achieve compliance to the extent possible. However, the requirements addressed in this Petition present ongoing compliance concerns that must be resolved through reconsideration and then appropriate regulatory amendments. Justice requires that EPA stay the Final Rule so that these issues can be resolved in an organized and fair manner without exposing PCS and other facilities to legal risks when it is impossible to achieve immediate compliance.

Although EPA has broad authority to stay the Final Rule because "justice so requires," 5 U.S.C. § 705, PCS notes that a stay would also be warranted under the criteria that courts apply when deciding whether to stay agency action. *See Affinity Healthcare Servs. v. Sebelius*, 720 F. Supp. 2d 12, 15 (D.D.C. 2010) ("Motions to stay agency action pursuant to [5 U.S.C. § 705] are reviewed under the same standards used to evaluate requests for interim injunctive relief"). "A plaintiff seeking a preliminary injunction must establish that he is likely to succeed on the merits, that he is likely to suffer irreparable harm in the absence of preliminary relief, that the balance of equities tips in his favor, and that an injunction is in the public interest." *Winter v. NRDC*, 555 U.S. 7, 20 (2008); *see also Mills v. D.C.*, 571 F.3d 1304, 1308 (D.C. Cir. 2009) (same).

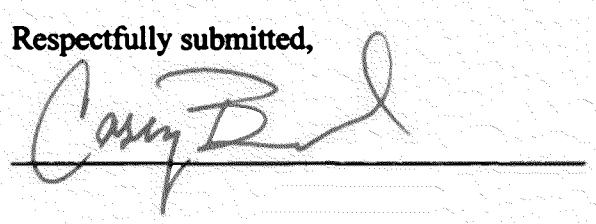
In this Petition, PCS has demonstrated that the total fluoride limit for calciners exceeds the results of actual emissions testing at the Aurora calciners during representative operating conditions. PCS is therefore likely to succeed on the merits of its claim that the total fluorides limit for the calciners must be revised to be consistent with the definition of an achievable MACT floor limit. Similarly, there is no doubt that immediate compliance with liquid-to-gas ratio monitoring, as required by the Final Rule, is impossible for low-energy absorbers at PCS facilities, and that additional time is needed to resolve technical challenges associated with liquid-to-gas ratio determinations. Absent a stay, PCS will continue to suffer irreparable harm in the form of legal risks, substantial costs, and interruption of normal plant operations as it attempts to deal with the errors in the Final Rule. Equity, justice, and the public interest require a stay in these circumstances.

CONCLUSION

For the foregoing reasons, EPA should grant this Petition for reconsideration, administratively stay the Final Rule, and take any other steps needed to immediately defer or otherwise nullify the requirements of the Final Rule pending the outcome of reconsideration or judicial review.

Dated: October 16, 2015

Respectfully submitted,



URS

Attachment A, Original Petition

April 29, 2014

Ms. Suzy Jordan
PCS Phosphate Co. Inc.
1530 NC Highway 306 South
Aurora, North Carolina 27806

Re: Summary Letter Report to Satisfy Requirements of the EPA 114 Request - Conducted on April 1-4, 2014 – Aurora, North Carolina

Dear Suzy:

The intent of this letter is to provide a summary of the test URS performed on Calciner Nos. 2 and 3 conducted April 1-4, 2014.

Background:

The objective of the testing was to evaluate the total fluoride (F^-), hydrogen fluoride (HF) from Calciner No. 3 and mercury (Hg) emissions levels from the Calciner No. 2 stack for submission to satisfy the EPA's 114 request. In addition to collecting the requested data, URS collected paired speciated mercury tubes for additional information. The test crew completed test runs of EPA Methods 1-4, 13B, 30B, 320 and collected speciated mercury tubes.

A total of six 60-minute runs were performed for EPA Method 320 by Fourier Transform Infrared Spectroscopy (FTIR) for hydrogen fluoride, four of which were run concurrently with EPA Method 13B. A total of six paired tubes for a sampling duration of 60 minutes by EPA Method 30B were collected. A total of three speciated paired tubes to differentiate the species of mercury emission were also collected, for internal purposes.

Tests Conducted:

The emissions testing on the Calciner No. 2 was completed April 1-2, 2014. The test team arrived on Monday March 31, 2014 to set up and start testing, however, high winds caused testing to become unsafe, and resulted in testing delayed until Tuesday when weather conditions improved. Emission testing on the Calciner No. 3 was completed April 3-4, 2014 for EPA Method 13B and EPA Method 320, because Calciner No. 2 went off line.

Mercury analysis for the EPA Method 30B and the speciated samples was completed at the URS Laboratory in Morrisville, NC. Test results for all emission sampling tests are summarized in Tables 1-4. Table 5 summarizes the QA/QC performed on the FTIR prior to and during the EPA Method 320 by FTIR sampling runs. Additional test run supporting data are provided in the attachments to this letter report.

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URS

Table 1

Summary of Speciated Paired Tubes Test Results
Calciner No. 2

Run	Sample Volume (L)	Average Speciated Hg Concentrations (µg/dscm)			Average Hg Concentration (µg/dscm)	Average Hg Emission (lb/hr)
		Particulate	Oxidized	Elemental		
4A	29.74	0.06	0.18	28.11	28.4	0.0040
4B	26.97					
6A	31.47	0.13	0.40	29.92	30.5	0.0043
6B	29.44					
7A	33.10	0.18	0.51	32.45	33.1	0.0049
7B	33.19					

Table 2

Summary of EPA Method 30B Paired Tubes Test Results
Calciner No. 2

Run	Sample Volume (L)	Hg Concentration (µg/dscm)	Average Hg Concentration (µg/dscm)	Average Hg Emission (lb/hr)
1A[1]	75.51	14.95	19.2	0.0027
1B	75.33	23.48		
2A	78.69	25.85	29.5	0.0041
2B	79.63	24.02		
3A	79.45	25.87	24.6	0.0035
3B	78.04	28.49		
5A	49.89	26.29	40.5	0.0057
5B	49.08	29.91		
8A	78.09	40.49	41.9	0.0062
8B	74.30	43.27		
9A	75.29	37.24	38.1	0.0054
9B	74.30	38.90		

[1] The spiked tubes for Run 1 A/B resulted in 71.19 ug/dscm, which is outside of the method specified matrix spike recovery criteria.

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Table 3

Summary of EPA Method 13B Test Results
Calciner No. 3

Run	Run Time	Total Fluoride (mg)	Fluoride Concentration (ppmv)	Oxygen (%)	Fluoride Concentration (ppmv @ 3% O_2)
1	09:05 – 10:15	0.686	0.905	14.7	2.61
2	11:06 – 12:13	0.843	1.126	15.1	3.48
3	13:00 – 14:05	0.194	0.270	14.2	0.72
4	14:55 – 16:02	0.157	0.218	15.3	0.70
Average		**0.470**	**0.630**	**14.8**	**1.88**

Table 4

Summary of HF EPA Method 320 Test Results
Calciner No. 3

Run	Run Time	HF Concentration (ppmv)	Oxygen (%)[2]	HF Concentration[1] (ppmv @ 3% O_2)
1	09:05 - 10:07	0.181	14.7	0.52
2	11:07 - 12:20	0.156	15.1	0.48
3	13:00 - 14:05	<0.141	14.2	0.38
4	14:55 - 16:01	<0.141	15.3	0.45
5	16:40 - 17:39	<0.141	14.8	0.42
6	18:23 - 19:21	<0.141	14.8	0.42

[1] The method detection limit of 0.141 ppmv was used to calculate the HF concentration of ppmv @ 3% O_2.

[2] EPA Method 320 was performed concurrently with EPA Method 13B for Runs 1-4. The O_2 level for Runs 5 and 6 were determined using an average of Runs 1-4.

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Table 5

Summary of Quality Assurance for
HF Method 320; Sulfur Hexafluoride (SF6) Tracer
Calciner No. 3

Start Time	Spike # [1]	Dilution Factor	Observed Spike (ppmv)	Native HF (ppmv)	Tracer Conc. (ppmv)	Expected Spike (ppmv)	Percent Recovery (%)	Spike Recovery Limits (%)
--	Pre-Test Spike 1	0.071	1.421	--	--	1.404	101.2	70 - 130
--	Pre-Test Spike 2	0.068	1.327	--	--	1.373	96.6	70 - 130
--	Pre-Test Spike 3	0.068	1.296	--	--	1.372	94.5	70 - 130
09:05 - 10:07	Post Run 1	0.072	1.353	0.250	0.617	1.200	112.7	70 - 130
11:07 - 12:20	Post Run 2	0.073	1.119	0.127	0.625	1.096	102.2	70 - 130
13:00 - 14:05	Post Run 3	0.076	1.027 < 0.035		0.644	1.048	98.0	70 - 130
14:55 - 16:01	Post Run 4	0.076	1.041 < 0.035		0.644	1.048	99.4	70 - 130
16:40 - 17:39	Post Run 5	0.074	1.105 < 0.035		0.634	1.032	107.0	70 - 130
18:23 - 19:21	Post Run 6	0.072	1.068 < 0.035		0.616	1.005	106.3	70 - 130

[1] HF MDL equals 0.141 ppmv.

An audit sample through the Source Sampling Audit Sample (SSAS) program was acquired from an Accredited Audit Sample Provider (AASP). The SSAS was analyzed by PCS in conjunction with a field sample in the laboratory. Table 6 summarizes the results from the Calciner No. 3 fluoride audit sample.

Table 6

Summary of AASP Audit Results

Parameter	Units	Laboratory Result	Acceptable Range	Assigned Value
Fluoride	mg/dscm	0.491	0.424 - 0.574	0.499

As documentation of test results from this testing event, the attachments to this letter include detailed EPA Method 13B and 30B emissions test summaries, copies of raw field data sheets, example calculations, equipment calibration records, and analytical results.

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If you have any questions regarding the results provided in this test report feel free to contact Bob Jongleux at (919)-461-1242.

Sincerely,

Bob Jongleux
Senior Scientist
URS Corporation

Enclosure

cc: Jimmy Hardy - PSC
Randy Taylor - URS
Ross Smith - PCS
Steve Hall - URS

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Attachment A
Data Summaries and Field Data

PCS Phosphate
Calciner #2
Mercury
Emission Calculations

O_2 Correction Basis: 3

Pollutant: Mercury

Run	Hg Concentration µg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration µg/dscm @ 3%	Flow Rate dscfm	Hg Emissions lb/hr	Hg Emissions oz/year
1	19.2	0.0023	15.8	67.4	37,723	0.0027	380.8
2	29.5	0.0035	15.8	103.5	36,966	0.0041	572.6
3	24.6	0.0030	15.8	86.5	38,118	0.0035	493.5
5	40.5	0.0049	15.8	142.1	37,803	0.0057	803.8
8	41.9	0.0050	13.8	105.6	39,382	0.0062	866.5
9	38.1	0.0046	13.6	93.4	38,072	0.0054	761.5
AVERAGE	**32.3**	**0.0039**	**15.1**	**99.7**	**38011**	**0.0046**	**646.4**

PCS Phosphate
Calciner #2
Mercury - Speiciated
Emission Calculations

O_2 Correction Basis 3 %

Pollutant:

Run	Hg Concentration µg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration µg/dscm @ 3%	Flow Rate dscfm	Hg Emissions lb/hr	Hg Emissions oz/year
4	28.4	0.0034	15.8	99.5	37,352	0.0040	556.4
6	30.5	0.0037	15.8	106.9	37,803	0.0043	604.8
7	33.1	0.0040	13.8	83.6	39,382	0.0049	685.7
AVERAGE	**30.6**	**0.0037**	**15.1**	**96.7**	**38,179**	**0.0044**	**633.1**

PCS Phosphate
Calciner # 3 **Normal**
Method 13B
Emission Calculations

O_2 Correction Basis 3 %

Pollutant: Fluoride

Run	Total F- Catch mg	Sample Volume dscf	F- Concentration mg/dscm	F- Concentration ppmV	Oxygen %	F- Concentration ppmV @ 3%	Flow Rate dscfm
1	0.686	33.885	0.71	0.905	14.7	2.61	39,250
2	0.843	33.453	0.89	1.126	15.1	3.48	38,934
3	0.194	32.131	0.21	0.270	14.2	0.72	37,604
4	0.157	32.136	0.17	0.218	15.3	0.70	38,143
Field Blank	0.000						
AVERAGE	**0.470**	**32.901**	**0.498**	**0.630**	**14.8**	**1.88**	**38483**

PCS Phosphate
Calciner # 3
FTIR EPA Method 320
Emission Calculations

O_2 Correction Basis	3

Pollutant: HF

Run	HF ppmV	Oxygen %	HF ppmV @ 3%
1	0.181	14.7	0.52
2	0.156	15.1	0.48
3	0.141	14.2	0.38
4	0.141	15.3	0.45
5	0.141	14.8	0.42
6	0.141	14.8	0.42
Field Blank			
AVERAGE	**0.150**	**14.8**	**0.46**

Method 2 Velocity Traverse

Run Number	1
Client/Plant	Potash Corp
Project Number	
Sampling Location	#2 Calciner
Condition	Normal
Static Pressure (Ps)	-0.1
Location Height (ft)	100
Barometric Pressure	30.04

Date	4/1/2014
Operator	PAT/WL
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	29.94
Abs. Stack Press. (in. Hg)	29.93

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.10	15.80	
Replicate 2			
Replicate 3			N2 Percent
Average	5.1	15.8	79.1

Moisture By: Saturation

Saturated Percent Moisture	18.66
Calculated Percent Moisture	18.66
Mole Frac of Dry Stack Gas	0.813
Average MW of Dry Gas	29.45
Average MW of Wet Gas	27.31

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.27	140	0.520	32.0
2	0.26	142	0.510	31.4
3	0.23	143	0.480	29.6
4	0.22	144	0.469	29.0
5	0.23	142	0.480	29.6
6	0.21	140	0.458	28.2
7	0.27	139	0.520	31.9
8	0.23	138	0.480	29.5
9	0.24	136	0.490	30.0
10	0.28	135	0.529	32.4
11	0.26	135	0.510	31.2
12	0.21	132	0.458	28.0
B1	0.31	144	0.557	34.4
2	0.32	143	0.566	34.9
3	0.30	141	0.548	33.7
4	0.32	140	0.566	34.8
5	0.32	140	0.566	34.8
6	0.36	143	0.600	37.0
7	0.20	140	0.447	27.5
8	0.23	133	0.480	29.3
9	0.24	133	0.490	30.0
10	0.22	132	0.469	28.7
11	0.21	132	0.458	28.0
12	0.20	132	0.447	27.3
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		138.29	0.50	30.96

Act Volumetric Flow Rate (acfm)	52530
Std. Volumetric Flow Rate (scfm)	46378
Dry Volumetric Flow Rate (dscfm)	37723

Method 2 Velocity Traverse

Run Number	2	Date	4/1/2014
Client/Plant	Potash Corp	Operator	PAT/WL
Project Number		Pitot Constant	0.84
Sampling Location	#2 Calciner	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.1	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.04	Corrected Baro. Pressure	29.94
		Abs. Stack Press. (in. Hg)	29.93

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.30	15.80	
Replicate 2			
Replicate 3			N2 Percent
Average	5.3	15.8	78.9

Moisture By: Saturation

Saturated Percent Moisture	17.72
Calculated Percent Moisture	17.72
Mole Frac of Dry Stack Gas	0.823
Average MW of Dry Gas	29.48
Average MW of Wet Gas	27.45

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.24	140	0.490	30.1
2	0.23	144	0.480	29.5
3	0.24	144	0.490	30.2
4	0.22	143	0.469	28.9
5	0.21	142	0.458	28.2
6	0.24	141	0.490	30.1
7	0.24	139	0.490	30.0
8	0.25	138	0.500	30.6
9	0.27	137	0.520	31.8
10	0.26	136	0.510	31.2
11	0.24	136	0.490	30.0
12	0.20	134	0.447	27.3
B1	0.26	132	0.510	31.1
2	0.32	133	0.566	34.5
3	0.28	133	0.529	32.3
4	0.29	133	0.539	32.9
5	0.32	133	0.566	34.5
6	0.24	133	0.490	29.9
7	0.23	133	0.480	29.3
8	0.20	132	0.447	27.3
9	0.20	132	0.447	27.3
10	0.19	132	0.436	26.6
11	0.18	132	0.424	25.9
12	0.21	132	0.458	27.9
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		136.00	0.49	29.88

Act Volumetric Flow Rate (acfm)	50690
Std. Volumetric Flow Rate (scfm)	44925
Dry Volumetric Flow Rate (dscfm)	36966

Method 2 Velocity Traverse

Run Number	3
Client/Plant	Potash Corp
Project Number	
Sampling Location	#2 Calciner
Condition	Normal
Static Pressure (Ps)	-0.1
Location Height (ft)	100
Barometric Pressure	30.04

Date	4/1/2014
Operator	PAT/WL
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	29.94
Abs. Stack Press. (in. Hg)	29.93

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.10	15.80	
Replicate 2			
Replicate 3			N2 Percent
Average	5.1	15.8	79.1

Moisture By: Saturation

Saturated Percent Moisture	18.66
Calculated Percent Moisture	18.66
Mole Frac of Dry Stack Gas	0.813
Average MW of Dry Gas	29.45
Average MW of Wet Gas	27.31

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.29	135	0.539	33.0
2	0.26	135	0.510	31.2
3	0.27	138	0.520	31.9
4	0.26	141	0.510	31.4
5	0.28	143	0.529	32.6
6	0.22	144	0.469	29.0
7	0.24	144	0.490	30.2
8	0.25	143	0.500	30.8
9	0.27	141	0.520	32.0
10	0.24	140	0.490	30.1
11	0.25	139	0.500	30.7
12	0.21	136	0.458	28.1
B1	0.28	137	0.529	32.5
2	0.30	138	0.548	33.6
3	0.34	139	0.583	35.8
4	0.32	139	0.566	34.8
5	0.28	136	0.529	32.4
6	0.33	139	0.574	35.3
7	0.24	139	0.490	30.1
8	0.22	139	0.469	28.8
9	0.24	138	0.490	30.1
10	0.25	137	0.500	30.7
11	0.22	136	0.469	28.8
12	0.20	134	0.447	27.4
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		138.75	0.51	31.31

Act Volumetric Flow Rate (acfm)	53121
Std. Volumetric Flow Rate (scfm)	46864
Dry Volumetric Flow Rate (dscfm)	38118

Method 2 Velocity Traverse

Run Number	4	Date	4/1/2014
Client/Plant	Potash Corp	Operator	PAT/WL
Project Number		Pitot Constant	0.84
Sampling Location	#2 Calciner	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.1	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.04	Corrected Baro. Pressure	29.94
		Abs. Stack Press. (in. Hg)	29.93

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.00	15.80	
Replicate 2			
Replicate 3			N2 Percent
Average	5.0	15.8	79.2

Moisture By: Saturation

Saturated Percent Moisture	19.29
Calculated Percent Moisture	19.29
Mole Frac of Dry Stack Gas	0.807
Average MW of Dry Gas	29.43
Average MW of Wet Gas	27.23

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.27	142	0.520	32.1
2	0.25	144	0.500	30.9
3	0.26	143	0.510	31.5
4	0.26	142	0.510	31.5
5	0.27	141	0.520	32.0
6	0.20	138	0.447	27.5
7	0.22	138	0.469	28.9
8	0.24	138	0.490	30.1
9	0.25	138	0.500	30.8
10	0.24	137	0.490	30.1
11	0.23	137	0.480	29.5
12	0.22	134	0.469	28.8
B1	0.29	140	0.539	33.2
2	0.31	142	0.557	34.4
3	0.33	142	0.574	35.5
4	0.32	141	0.566	34.9
5	0.26	140	0.510	31.4
6	0.31	140	0.557	34.3
7	0.27	139	0.520	32.0
8	0.21	138	0.458	28.2
9	0.24	137	0.490	30.1
10	0.23	136	0.480	29.5
11	0.22	136	0.469	28.8
12	0.19	134	0.436	26.7
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		139.04	0.50	30.94

Act Volumetric Flow Rate (acfm)	52482
Std. Volumetric Flow Rate (scfm)	46277
Dry Volumetric Flow Rate (dscfm)	37352

Method 2 Velocity Traverse

Run Number	5	Date	4/1/2014
Client/Plant	Potash Corp	Operator	PAT/WL
Project Number		Pitot Constant	0.84
Sampling Location	#2 Calciner	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.1	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.04	Corrected Baro. Pressure	29.94
		Abs. Stack Press. (in. Hg)	29.93

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.00	15.80	
Replicate 2			
Replicate 3			N2 Percent
Average	5.0	15.8	79.2

Moisture By: Saturation

Saturated Percent Moisture	18.18
Calculated Percent Moisture	18.18
Mole Frac of Dry Stack Gas	0.818
Average MW of Dry Gas	29.43
Average MW of Wet Gas	27.35

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.26	136	0.510	31.2
2	0.24	137	0.490	30.0
3	0.22	138	0.469	28.8
4	0.23	138	0.480	29.4
5	0.21	138	0.458	28.1
6	0.23	137	0.480	29.4
7	0.28	137	0.529	32.4
8	0.29	137	0.539	33.0
9	0.27	136	0.520	31.8
10	0.22	139	0.469	28.8
11	0.21	137	0.458	28.1
12	0.19	135	0.436	26.7
B1	0.31	134	0.557	34.1
2	0.33	136	0.574	35.2
3	0.28	137	0.529	32.4
4	0.32	139	0.566	34.7
5	0.35	139	0.592	36.3
6	0.28	140	0.529	32.5
7	0.25	138	0.500	30.7
8	0.23	137	0.480	29.4
9	0.22	137	0.469	28.8
10	0.22	137	0.469	28.8
11	0.25	136	0.500	30.6
12	0.20	135	0.447	27.4
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		137.08	0.50	30.79

Act Volumetric Flow Rate (acfm)	52228
Std. Volumetric Flow Rate (scfm)	46205
Dry Volumetric Flow Rate (dscfm)	37803

Method 2 Velocity Traverse

Run Number	6
Client/Plant	Potash Corp
Project Number	
Sampling Location	#2 Calciner
Condition	Normal
Static Pressure (Ps)	-0.1
Location Height (ft)	100
Barometric Pressure	30.12

Date	4/2/2014
Operator	PAT/WL
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	30.02
Abs. Stack Press. (in. Hg)	30.01

Assumed	CO2 Percent	O2 Percent	
Replicate 1	6.90	13.80	
Replicate 2			
Replicate 3			N2 Percent
Average	6.9	13.8	79.3

Moisture By: Saturation

Saturated Percent Moisture	24.00
Calculated Percent Moisture	24.00
Mole Frac of Dry Stack Gas	0.760
Average MW of Dry Gas	29.66
Average MW of Wet Gas	26.86

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.33	145	0.574	35.7
2	0.30	153	0.548	34.3
3	0.32	155	0.566	35.5
4	0.31	154	0.557	34.9
5	0.29	153	0.539	33.7
6	0.32	151	0.566	35.4
7	0.29	146	0.539	33.5
8	0.32	146	0.566	35.2
9	0.30	148	0.548	34.2
10	0.32	151	0.566	35.4
11	0.32	153	0.566	35.4
12	0.28	150	0.529	33.1
B1	0.38	142	0.616	38.3
2	0.41	146	0.640	39.9
3	0.42	148	0.648	40.4
4	0.38	148	0.616	38.4
5	0.40	147	0.632	39.4
6	0.40	146	0.632	39.4
7	0.32	146	0.566	35.2
8	0.24	145	0.490	30.5
9	0.34	144	0.583	36.2
10	0.22	149	0.469	29.3
11	0.24	151	0.490	30.6
12	0.21	152	0.458	28.7
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		148.71	0.56	35.11
			Act Volumetric Flow Rate (acfm)	59558
			Std. Volumetric Flow Rate (scfm)	51821
			Dry Volumetric Flow Rate (dscfm)	39382

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Method 2 Velocity Traverse

Run Number	7
Client/Plant	Potash Corp
Project Number	
Sampling Location	#2 Calciner
Condition	Normal
Static Pressure (Ps)	-0.2
Location Height (ft)	100
Barometric Pressure	30.12

Date	4/2/2014
Operator	PAT/WL
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	30.02
Abs. Stack Press. (in. Hg)	30.01

Assumed	CO2 Percent	O2 Percent	
Replicate 1	7.20	13.60	
Replicate 2			
Replicate 3			N2 Percent
Average	7.2	13.6	79.2

Moisture By: Saturation

Saturated Percent Moisture	22.27
Calculated Percent Moisture	22.27
Mole Frac of Dry Stack Gas	0.777
Average MW of Dry Gas	29.70
Average MW of Wet Gas	27.09

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.28	148	0.529	32.9
2	0.32	149	0.566	35.2
3	0.27	150	0.520	32.3
4	0.26	151	0.510	31.7
5	0.28	152	0.529	33.0
6	0.29	152	0.539	33.6
7	0.30	150	0.548	34.1
8	0.31	149	0.557	34.6
9	0.33	147	0.574	35.6
10	0.29	146	0.539	33.4
11	0.30	145	0.548	33.9
12	0.24	145	0.490	30.4
B1	0.30	141	0.548	33.8
2	0.41	143	0.640	39.6
3	0.30	143	0.548	33.9
4	0.31	144	0.557	34.5
5	0.29	144	0.539	33.3
6	0.27	143	0.520	32.1
7	0.26	143	0.510	31.5
8	0.25	143	0.500	30.9
9	0.27	143	0.520	32.1
10	0.23	143	0.480	29.7
11	0.25	142	0.500	30.9
12	0.23	142	0.480	29.6
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		145.75	0.53	33.03

Act Volumetric Flow Rate (acfm)	56029
Std. Volumetric Flow Rate (scfm)	48977
Dry Volumetric Flow Rate (dscfm)	38072

URS

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 3**
Condition	**Normal**
Sample Type:	**Method 13B**

Run Number: / Date:	1 4-Apr-14	2 4-Apr-14	3 4-Apr-14	4 4-Apr-14	Average
Total Sampling Time (min)	60.0	60.0	60.0	60.0	60.0
Corrected Barometric Pressure (in Hg)	29.79	29.79	29.79	29.79	29.79
Absolute Stack Pressure (in H2O)	29.77	29.77	29.77	29.77	29.77
Stack Static Pressure (in H2O)	-0.24	-0.24	-0.24	-0.24	-0.24
Average Stack Temperature (°F	151.0	152.5	152.3	151.1	151.9
Stack Area (sq in)	4072	4072	4072	4072	4072
Actual Meter Volume (cu ft)	36.119	36.257	34.972	35.252	35.783
Average Meter Pressure (in H2O)	1.28	1.26	1.18	1.20	1.24
Average Meter Temperature (°F	91.3	100.6	102.8	107.3	98.2
Moisture Collected (g)	297.5	319.6	299.9	277.3	305.7
Carbon Dioxide Concentration (%V)	6.1	5.7	6.5	5.6	6.1
Oxygen Concentration (%V)	14.7	15.1	14.2	15.3	14.7
Nitrogen Concentration (%V)	79.3	79.2	79.3	79.1	79.3
Dry Gas Meter Factor (γ_δ)	0.9808	0.9808	0.9808	0.9808	0.9808
Nozzle Diameter (in)	0.276	0.276	0.276	0.276	0.276
Pitot Constant	0.84	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.565	0.558	0.536	0.536	0.553
Standard Metered Volume (dscf)	33.885	33.453	32.131	32.136	33.156
Standard Metered Volume (dscm)	0.960	0.947	0.910	0.910	0.939
Stack Moisture (%V)	29.3	31.1	30.6	28.9	30.3
Saturated Moisture (%V)	26.1	26.7	26.7	26.1	26.5
Mole Fraction Dry Stack Gas	0.739	0.733	0.733	0.739	0.735
Dry Molecular Weight	29.56	29.52	29.61	29.51	29.56
Wet Molecular Weight	26.54	26.44	26.51	26.51	26.50
Average SQRT of Delta P	0.58	0.58	0.56	0.56	0.57
Stack Gas Velocity (fps)	36.4	36.5	35.2	35.4	36.0
Stack Gas Velocity (mpm)	11.1	11.1	10.7	10.8	11.0
Volumetric Flow Rate (acfm)	61740	61936	59795	60003	61157
Volumetric Flow Rate (acmm)	1748	1754	1693	1699	1732
Volumetric Flow Rate (dscfm)	39250	38934	37604	38143	38596
Volumetric Flow Rate (dscmm)	1112	1103	1065	1080	1093
Percent Isokinetic	98.0	97.5	97.0	95.6	97.5
Post Test Meter QA (γ_{qa})	1.0253	1.0220	1.0268	1.0355	1.0247

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	31829746
Sampling Location	Calciner # 3
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9808
Minutes per Point	2.5
Barometric Pressure	29.89

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	
Replicate 1	6.1	14.7	
Replicate 2			
Replicate 3			N2 Percent
Average	6.1	14.7	79.3

Date	4/4/2014
Operator	WL/PAT
Run Number	1
K Factor	
Meter $\Delta H_@$	1.9070
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.277
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.276

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	697.9	931.8	233.9
Impinger 2	661.8	673.9	12.1
Impinger 3	630.1	656.5	26.4
Impinger 4	895.4	920.5	25.1
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			297.5
Pitot Tube ID			
Saturated Percent Moisture		26.06	Standard
Calculated Percent Moisture		29.28	Volume (dscf)
Isokinetic %		98.0	33.9

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	9:05:00	756.075	0.41	1.59	149	87	87
A2	2.5	9:07:30	757.660	0.46	1.70	153	87	87
A3	5	9:10:00	759.320	0.48	1.86	149	88	88
A4	7.5	9:12:30	761.030	0.44	1.85	143	88	88
A5	10	9:15:00	762.710	0.44	1.60	153	88	88
A6	12.5	9:17:30	764.340	0.43	1.56	153	89	88
A7	15	9:20:00	765.970	0.28	1.16	144	89	88
A8	17.5	9:22:30	767.530	0.25	0.91	154	89	88
A9	20	9:25:00	768.840	0.27	0.98	154	91	89
A10	22.5	9:27:30	770.150	0.28	1.10	148	92	89
A11	25	9:30:00	771.560	0.23	0.83	157	92	90
A12	27.5	9:32:30	772.850	0.24	0.87	158	92	90
STOP	30	9:35:00	774.193					
B1	30	9:45:00	774.193	0.41	1.49	155	92	92
B2	32.5	9:47:30	776.010	0.39	1.62	144	93	92
B3	35	9:50:00	777.680	0.32	1.16	154	93	92
B4	37.5	9:52:30	779.350	0.35	1.27	155	93	93
B5	40	9:55:00	780.810	0.26	1.03	147	94	93
B6	42.5	9:57:30	782.190	0.38	1.38	154	94	93
B7	45	10:00:00	783.750	0.31	1.12	154	95	93
B8	47.5	10:02:30	785.180	0.29	1.19	145	97	94
B9	50	10:05:00	786.690	0.31	1.12	153	95	94
B10	52.5	10:07:30	788.070	0.30	1.14	150	96	94
B11	55	10:10:00	789.430	0.28	1.15	145	96	94
B12	57.5	10:12:30	791.000	0.26	0.94	154	96	94
	60	10:15:00	792.194					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	31829746
Sampling Location	Calciner # 3
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9808
Minutes per Point	2.5
Barometric Pressure	29.89

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	
Replicate 1	5.7	15.1	
Replicate 2			
Replicate 3			N2 Percent
Average	5.7	15.1	79.2

Date	4/4/2014
Operator	WL/PAT
Run Number	2
K Factor	
Meter $\Delta H_@$	1.9070
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.277
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.276

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	607.4	861.2	253.8
Impinger 2	797.4	850.1	52.7
Impinger 3	662.2	665.1	2.9
Impinger 4	919.1	929.3	10.2
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			319.6
Pitot Tube ID			
Saturated Percent Moisture		26.72	Standard
Calculated Percent Moisture		31.06	Volume (dscf)
Isokinetic %		97.5	33.5

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Tm out (F)
A1	0	11:06:00	792.219	0.38	1.42	151	98	99
A2	2.5	11:08:30	793.840	0.36	1.31	156	98	99
A3	5	11:11:00	795.420	0.37	1.45	148	98	99
A4	7.5	11:13:30	797.040	0.34	1.33	148	99	99
A5	10	11:16:00	798.640	0.35	1.27	156	99	99
A6	12.5	11:18:30	800.170	0.37	1.41	150	100	99
A7	15	11:21:00	801.770	0.34	1.23	155	100	99
A8	17.5	11:23:30	803.240	0.30	1.09	154	100	99
A9	20	11:26:00	804.730	0.29	1.12	149	101	100
A10	22.5	11:28:30	806.110	0.27	0.99	152	101	100
A11	25	11:31:00	807.480	0.32	1.16	154	102	101
A12	27.5	11:33:30	808.680	0.23	0.87	150	102	101
STOP	30	11:36:00	810.245					
B1	30	11:43:00	810.245	0.44	1.73	148	101	102
B2	32.5	11:45:30	811.960	0.48	1.74	157	101	102
B3	35	11:48:00	813.680	0.43	1.71	147	102	102
B4	37.5	11:50:30	815.400	0.42	1.52	154	102	101
B5	40	11:53:00	817.070	0.45	1.63	156	102	101
B6	42.5	11:55:30	818.780	0.43	1.61	151	102	101
B7	45	11:58:00	820.510	0.30	1.11	152	102	101
B8	47.5	12:00:30	822.010	0.28	1.01	156	102	101
B9	50	12:03:00	823.390	0.25	0.91	155	101	101
B10	52.5	12:05:30	824.680	0.24	0.87	153	101	101
B11	55	12:08:00	825.970	0.24	0.87	158	102	101
B12	57.5	12:10:30	827.270	0.20	0.76	150	102	101
	60	12:13:00	828.476					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	31829746
Sampling Location	Calciner # 3
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9808
Minutes per Point	2.5
Barometric Pressure	29.89

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	
Replicate 1	6.5	14.2	
Replicate 2			
Replicate 3			N2 Percent
Average	6.5	14.2	79.3

Date	4/4/2014
Operator	WL/PAT
Run Number	3
K Factor	
Meter $\Delta H_@$	1.9070
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.277
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.276

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	731.4	984.4	253
Impinger 2	742	775.2	33.2
Impinger 3	681.8	684.2	2.4
Impinger 4	988.5	999.8	11.3
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			299.9
Pitot Tube ID			
Saturated Percent Moisture		26.72	Standard
Calculated Percent Moisture		30.56	Volume (dscf)
Isokinetic %		97.0	32.1

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Tm out (F)
A1	0	13:00:00	828.619	0.40	1.57	148	99	100
A2	2.5	13:02:30	830.080	0.43	1.56	156	99	100
A3	5	13:05:00	831.740	0.44	1.60	153	99	100
A4	7.5	13:07:30	833.410	0.40	1.64	145	99	100
A5	10	13:10:00	835.080	0.43	1.56	153	100	100
A6	12.5	13:12:30	836.770	0.46	1.72	151	101	101
A7	15	13:15:00	838.530	0.27	1.07	147	102	101
A8	17.5	13:17:30	840.020	0.28	1.01	156	102	101
A9	20	13:20:00	841.390	0.25	0.91	157	103	101
A10	22.5	13:22:30	842.680	0.24	0.97	146	103	101
A11	25	13:25:00	844.030	0.22	0.80	155	104	102
A12	27.5	13:27:30	845.280	0.20	0.72	157	104	102
STOP	30	13:30:00	846.449					
B1	30	13:35:00	846.449	0.34	1.23	154	105	104
B2	32.5	13:37:30	848.150	0.33	1.20	154	105	104
B3	35	13:40:00	849.420	0.30	1.09	155	105	104
B4	37.5	13:42:30	850.900	0.32	1.24	149	105	104
B5	40	13:45:00	852.380	0.31	1.12	156	105	104
B6	42.5	13:47:30	853.830	0.30	1.09	156	105	104
B7	45	13:50:00	855.240	0.28	1.11	147	105	104
B8	47.5	13:52:30	856.670	0.29	1.05	154	105	104
B9	50	13:55:00	858.060	0.29	1.10	150	105	104
B10	52.5	13:57:30	859.480	0.26	1.02	148	106	104
B11	55	14:00:00	860.890	0.27	0.98	154	106	104
B12	57.5	14:02:30	862.350	0.24	0.87	153	106	105
	60	14:05:00	863.591					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	31829746
Sampling Location	Calciner # 3
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9808
Minutes per Point	2.5
Barometric Pressure	29.89

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent
Replicate 1	5.6	15.3
Replicate 2		
Replicate 3		
Average	5.6	15.3

N2 Percent 79.1

Date	4/4/2014
Operator	WL/PAT
Run Number	4
K Factor	
Meter $\Delta H_@$	1.9070
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.277
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.276

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	746.2	983.6	237.4
Impinger 2	687.2	715.9	28.7
Impinger 3	533.6	534.9	1.3
Impinger 4	958.8	968.7	9.9
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			277.3
Pitot Tube ID			
Saturated Percent Moisture		26.06	Standard
Calculated Percent Moisture		28.92	Volume (dscf)
Isokinetic %		95.6	32.1

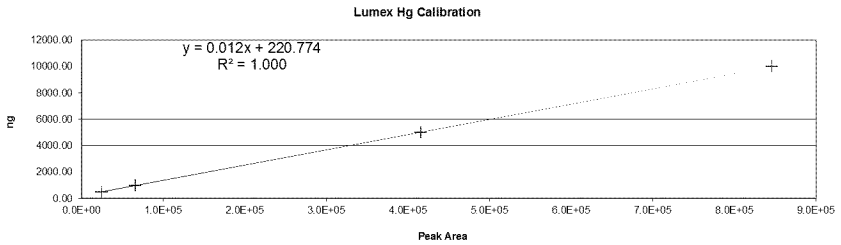
Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Tm out (F)
A1	0	14:55:00	864.319	0.37	1.49	146	106	107
A2	2.5	14:57:30	866.080	0.33	1.22	152	106	107
A3	5	15:00:00	867.560	0.35	1.27	156	106	107
A4	7.5	15:02:30	869.110	0.36	1.35	151	106	107
A5	10	15:05:00	870.780	0.29	1.17	146	107	108
A6	12.5	15:07:30	872.310	0.32	1.16	155	108	108
A7	15	15:10:00	873.660	0.29	1.05	155	108	108
A8	17.5	15:12:30	875.040	0.27	1.10	145	109	109
A9	20	15:15:00	876.480	0.24	0.87	154	109	109
A10	22.5	15:17:30	877.790	0.27	0.98	155	109	109
A11	25	15:20:00	879.160	0.28	1.16	144	108	109
A12	27.5	15:22:30	880.680	0.24	0.87	154	107	109
STOP	30	15:25:00	881.932					
B1	30	15:32:00	881.932	0.48	1.91	147	107	108
B2	32.5	15:34:30	883.810	0.44	1.70	149	106	108
B3	35	15:37:00	885.520	0.34	1.23	155	107	107
B4	37.5	15:39:30	887.050	0.42	1.60	150	107	107
B5	40	15:42:00	888.520	0.42	1.60	150	106	107
B6	42.5	15:44:30	890.010	0.38	1.38	155	107	107
B7	45	15:47:00	891.470	0.29	1.09	151	107	107
B8	47.5	15:49:30	892.910	0.27	1.04	149	107	107
B9	50	15:52:00	894.350	0.25	0.91	155	107	107
B10	52.5	15:54:30	895.640	0.26	1.00	149	107	107
B11	55	15:57:00	896.980	0.22	0.86	148	106	106
B12	57.5	15:59:30	898.310	0.23	0.83	155	106	106
	60	16:02:00	899.571					

URS

QC Summary

	Slope:	1.15E-02	MDL (ng)	0.432	Temp. Profile #	3	QC Recovery	CCV	Response Factor	Spike	2200	min	max
	Intercept:	220.77	DCS (ng)		Air Flow (l/min)	1	min	331.2%	0.03367	0.0%		1100	3300
	R^2:	1.000	DL (ng)	0.432			max	331.2%		0.0%			

Project Name	PCS - 30B
URS Project #	31829725.00001



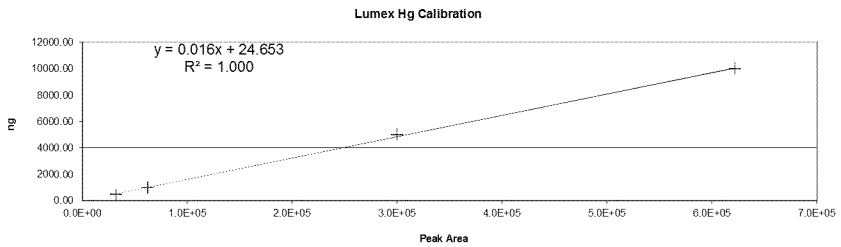
Sampling Date	Analysis Date	Sample ID: Facility ID	Unit/Stack #		Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
3/11/2014	3/11/2104				100ng ref			100.00	2,970	255.1	255.1%								
					500ng			500.00	24,400	502.5	100.5%								
					1000ng			1000.00	66,100	984.0	98.4%								
					5000ng			5000.00	416,000	5024.2	100.5%								
					10000ng			10000.00	846,000	9989.3	99.9%								
					ICV			1000.00	59,200	904.3	90.4%								
					CCV			1000.00	59,800	911.3	91.1%								
3/11/2014	3/11/2014	PCS	Calciner #2	-	Stack 1A	OL172024	Section 1		267,000	3303.7		3329.0	0.8%	75.51	14.95	19.22	20.74	71.19	22.19
							Section 2		751	25.3									
		PCS	Calciner #2	-	Stack 1B	OL207693	Section 1		131,000	1733.4		1768.7	2.0%	75.33	23.48				
							Section 2		1,050	35.4									
3/11/2014	3/11/2014	PCS	Calciner #2	-	Stack 2A	OL172017	Section 1		345,000	4204.4		4234.5	0.7%	78.69	25.85	24.94	29.48	105.46	3.68
							Section 2		893	30.1									
		PCS	Calciner #2	-	Stack 2B	OL207680	Section 1		146,000	1906.6		1912.4	0.3%	79.63	24.02				
							Section 2		174	5.9									
3/11/2014	3/11/2014	PCS	Calciner #2	-	Stack 3A	OL172033	Section 1		344,000	4192.8		4255.5	1.5%	79.45	25.87	27.18	24.64	88.99	4.82
							Section 2		1,860	62.6									
		PCS	Calciner #2	-	Stack 3B	OL207655	Section 1		171,000	2195.3		2223.4	1.3%	78.04	28.49				
							Section 2		837	28.2									
3/11/2014	3/11/2014	PCS	Calciner #2	-	Stack 5A	OL172029	Section 1		285,000	3511.6		3511.6	0.0%	49.89	26.29	28.10	40.48	91.80	6.44
							Section 2		0	0.0									
		PCS	Calciner #2	-	Stack 5B	OL207643	Section 1		108,000	1467.8		1467.8	0.0%	49.08	29.91				
							Section 2		0	0.0									
3/11/2014	3/11/2014	PCS	Calciner #2	-	FB-A	OL211455	Section 1		183,000	2333.8		2333.8	0.0%	73.93	1.81	2.41	28.55	95.94	NA
							Section 2		0	0.0									
		PCS	Calciner #2	-	FB-B	OL207686	Section 1		0	220.8		220.8	0.0%	73.17	3.02				
							Section 2		0	0.0									
					CCV			1000.00	63,800	957.5	95.7%								

Analyst: Stephanie Chesebro Date 4/3/2014

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URS												
	Slope:	1.61E-02	MDL (ng)	0.432	Temp. Profile #	3	QC Recovery	CCV	Response Factor	Spike	2200	min	max
QC Summary	Intercept:	24.65	DCS (ng)		Air Flow (l/min)	1	min	178.9%	0.01304	0.0%		1100	3300
	R^2:	1.000	DL (ng)	0.432			max	178.9%		0.0%			

Project Name	PCS - 30B
URS Project #	31829725.00001



Sampling Date	Analysis Date	Sample ID: Facility ID	Unit/Stack #	Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
3/11/2014	3/11/2104			100ng ref			100.00	7,670	148.4	148.4%								
				500ng			500.00	32,100	542.5	108.5%								
				1000ng			1000.00	62,500	1033.0	103.3%								
				5000ng			5000.00	300,000	4864.7	97.3%								
				10000ng			10000.00	622,000	10059.7	100.6%								
				ICV			1000.00	61,500	1016.9	101.7%								
				CCV			1000.00	62,600	1034.6	103.5%								
3/11/2014	3/11/2014	PCS	Calciner #2 -	Stack 8A	OL211456	Section 1		330,000	5348.7		5362.0	0.2%	78.09	40.49	41.88	25.39	90.11	3.31
						Section 2		1,020	13.3									
		PCS	Calciner #2 -	Stack 8B	OL207687	Section 1		197,000	3203.0		3214.7	0.4%	74.30	43.27				
						Section 2		900	11.7									
3/11/2014	3/11/2014	PCS	Calciner #2 -	Stack 9A	OL172053	Section 1		302,000	4897.0		5004.0	2.2%	75.29	37.24	38.07	26.93	92.15	2.18
						Section 2		8,210	107.0									
		PCS	Calciner #2 -	Stack 9B	OL207681	Section 1		174,000	2831.9		2890.3	2.1%	74.30	38.90				
						Section 2		4,480	58.4									
				CCV			1000.00	63,600	1050.7	105.1%								

Analyst: Stephanie Chesebro Date 4/4/2014

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00040

URS

METHOD 30B

Run No. 1

Date	4/1/2014		Sorbent Trap Number	OL172024	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	16	Barometric Pres. (" Hg)	30.04	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	11:35:00	0.000		1	146	253	64	34	261	2
	5	11:40	6.480		1	146	254	64	34	261	2
	10	11:45	12.310		1	146	286	65	34	263	3
	15	11:50	18.400		1	146	290	65	34	267	3
	20	11:55	24.090		1	146	265	65	34	267	3
	25	12:00	30.340		1	146	251	65	34	264	3
	30	12:05	36.460		1	146	283	65	34	263	3
	35	12:10	42.390		1	146	298	65	34	266	3
	40	12:15	48.940		1	146	272	65	34	266	3
	45	12:20	55.410		1	146	261	65	34	265	3
	50	12:25	61.970		1	146	272	65	34	262	3
	55	12:30	68.350		1	146	298	65	34	265	3
	60	12:35	74.7920		1	146	274	65	34	266	3
TOTAL			74.7920	74.7920	1	146	273.62	64.85	34.00	264.31	2.85
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**75510.74482**	**75.5107448**

17cv1906 Sierra Club v. EPA - 6/22 Production

ED_001523_00007569-00041

URS

METHOD 30B

Date	4/1/2014		Sorbent Trap Number	OL207693	Meter Number	8002511
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %	
Operator	WL		Minutes Per Point		K-factor	
Location Height			Ambient Temp. (F)		O2 %	
Initial Leak Check (L/min @ "Hg)	0.000	22	Static Pressure (" H_20)		CO2%	
Final Leak Check (L/min @ "Hg)	0.000	19	Barometric Pres. (" Hg)	30.04	O2/CO2 Method	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	11:35:00	0.000		1	146	253	66	34	261	5
	5	11:40	6.820		1	146	254	66	34	261	5
	10	11:45	13.110		1	146	286	67	34	263	5
	15	11:50	19.120		1	146	290	67	34	267	5
	20	11:55	25.550		1	146	265	66	34	267	5
	25	12:00	31.090		1	146	251	66	34	264	5
	30	12:05	38.280		1	146	283	66	34	263	5
	35	12:10	44.490		1	146	298	66	34	266	5
	40	12:15	50.620		1	146	272	65	34	266	5
	45	12:20	56.980		1	146	261	66	34	265	5
	50	12:25	63.330		1	146	272	66	34	262	5
	55	12:30	69.470		1	146	298	66	34	265	5
	60	12:35	75.6390		1	146	274	66	34	266	5
TOTAL			75.6390	75.6390	1	146	273.62	66.08	34.00	264.31	5.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**75333.4754**	**75.3334754**

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ED_001523_00007569-00042

URS

METHOD 30B

Date	4/1/2014		Sorbent Trap Number	OL172017	Meter Number	8002547
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %	
Operator	WL		Minutes Per Point		K-factor	
Location Height			Ambient Temp. (F)		O2 %	
Initial Leak Check (L/min @ "Hg)	0.000	22	Static Pressure (" H_20)		CO2%	
Final Leak Check (L/min @ "Hg)	0.000	16	Barometric Pres. (" Hg)	30.04	O2/CO2 Method	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:50:00	0.000		1	146	284	66	34	259	3
	5	12:55	6.730		1	146	284	66	34	260	3
	10	13:00	13.160		1	146	291	66	34	263	3
	15	13:05	19.740		1	146	261	65	34	263	3
	20	13:10	26.470		1	146	271	65	34	264	3
	25	13:15	32.870		1	146	286	65	34	262	3
	30	13:20	39.160		1	146	294	65	34	264	3
	35	13:25	45.670		1	146	288	65	34	265	3
	40	13:30	52.360		1	146	272	65	34	266	3
	45	13:35	58.590		1	146	277	65	34	263	3
	50	13:40	65.040		1	146	269	65	34	264	3
	55	13:45	71.390		1	146	280	65	34	264	3
	60	13:50	78.0000		1	146	281	65	34	264	3
TOTAL			78.0000	78.0000	1	146	279.85	65.23	34.00	263.15	3.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**78691.87053**	**78.6918705**

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ED_001523_00007569-00043

URS

METHOD 30B

Date	4/1/2014		Sorbent Trap Number	OL207680	Meter Number	8002511
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %	
Operator	WL		Minutes Per Point		K-factor	
Location Height			Ambient Temp. (F)		O2 %	
Initial Leak Check (L/min @ "Hg)	0.000	24	Static Pressure (" H_20)		CO2%	
Final Leak Check (L/min @ "Hg)	0.000	18	Barometric Pres. (" Hg)	30.04	O2/CO2 Method	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:50:00	0.000		1	146	284	67	34	259	5
	5	12:55	6.920		1	146	284	67	34	260	5
	10	13:00	13.290		1	146	291	67	34	263	5
	15	13:05	19.830		1	146	261	66	34	263	5
	20	13:10	26.480		1	146	271	66	34	264	5
	25	13:15	32.930		1	146	286	66	34	262	5
	30	13:20	39.320		1	146	294	66	34	264	5
	35	13:25	45.680		1	146	288	66	34	265	5
	40	13:30	52.220		1	146	272	66	34	266	5
	45	13:35	58.390		1	146	277	66	34	263	5
	50	13:40	65.130		1	146	269	66	34	264	5
	55	13:45	71.440		1	146	280	66	34	264	5
	60	13:50	79.9730		1	146	281	66	34	264	5
TOTAL			79.9730	79.9730	1	146	279.85	66.23	34.00	263.15	5.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**79626.66863**	**79.6266686**

URS

METHOD 30B

Run No. 3

Date	4/1/2014		Sorbent Trap Number	OL172033	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	15	Barometric Pres. (" Hg)	30.04	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:05:00	0.000		1	141	280	64	34	263	3
	5	14:10	6.820		1	141	288	64	34	262	3
	10	14:15	13.300		1	141	288	64	34	262	3
	15	14:20	19.910		1	141	272	65	34	263	3
	20	14:25	26.480		1	141	273	65	34	262	3
	25	14:30	32.940		1	141	264	65	34	263	3
	30	14:35	39.270		1	141	289	65	34	264	3
	35	14:40	45.910		1	141	289	65	34	263	3
	40	14:45	52.670		1	141	264	64	34	263	3
	45	14:50	59.700		1	141	271	64	34	264	3
	50	14:55	65.850		1	141	283	64	34	263	3
	55	15:00	72.140		1	141	291	64	34	263	3
	60	15:05	78.6240		1	141	288	64	34	263	3
TOTAL			78.6240	78.6240	1	141	280.00	64.38	34.00	262.92	3.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**79449.48015**	**79.4494801**

URS

METHOD 30B

Run No. 3

Date	4/1/2014		Sorbent Trap Number	OL207655	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	23	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	18	Barometric Pres. (" Hg)	30.04	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:05:00	0.000		1	141	280	65	34	263	5
	5	14:10	6.940		1	141	288	65	34	262	5
	10	14:15	13.620		1	141	288	65	34	262	5
	15	14:20	20.420		1	141	272	65	34	263	5
	20	14:25	27.050		1	141	273	65	34	262	5
	25	14:30	33.550		1	141	264	65	34	263	5
	30	14:35	39.850		1	141	289	65	34	264	5
	35	14:40	46.160		1	141	289	65	34	263	5
	40	14:45	52.560		1	141	264	65	34	263	5
	45	14:50	59.410		1	141	271	65	34	264	5
	50	14:55	65.500		1	141	283	65	34	263	5
	55	15:00	71.740		1	141	291	65	34	263	5
	60	15:05	78.1920		1	141	288	65	34	263	5
TOTAL			78.1920	78.1920	1	141	280.00	65.00	34.00	262.92	5.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**78036.00965**	**78.0360096**

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URS

METHOD 30B

Run No. 5

Date	4/1/2014		Sorbent Trap Number	OL172029	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	5	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	20	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	16:41:00	0.000		0.5	140	270	62	34	258	1
	5	16:46	4.270		0.5	140	270	62	34	260	1
	10	16:51	7.950		0.5	140	261	62	34	258	1
	15	16:56	12.620		0.5	140	287	61	34	258	1
	20	17:01	16.090		0.5	140	269	62	34	261	1
	25	17:06	20.140		0.5	140	274	61	34	261	1
	30	17:11	24.400		0.5	140	259	61	34	262	1
	35	17:16	28.480		0.5	140	261	61	34	259	1
	40	17:21	32.870		0.5	140	258	61	34	262	1
	45	17:26	37.400		0.5	140	273	61	34	262	1
	50	17:31	40.620		0.5	140	258	62	34	263	1
	55	17:36	44.850		0.5	140	254	63	34	262	1
	60	17:41	48.9910		0.5	140	252	63	34	261	1
TOTAL			48.9910	48.9910	0.5	140	265.08	61.69	34.00	260.54	1.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**49893.52504**	**49.893525**

URS

METHOD 30B

Run No. 5

Date	4/1/2014		Sorbent Trap Number	OL211456	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	5	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	23	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	23	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	16:41:00	0.000		0.5	140	270	63	34	272	3
	5	16:46	4.510		0.5	140	270	63	34	273	3
	10	16:51	8.420		0.5	140	261	63	34	275	3
	15	16:56	13.610		0.5	140	287	62	34	274	3
	20	17:01	16.330		0.5	140	269	62	34	276	3
	25	17:06	20.270		0.5	140	274	62	34	278	3
	30	17:11	24.450		0.5	140	259	62	34	278	3
	35	17:16	28.400		0.5	140	261	62	34	279	3
	40	17:21	32.910		0.5	140	258	62	34	279	3
	45	17:26	36.890		0.5	140	273	62	34	279	3
	50	17:31	40.250		0.5	140	258	63	34	279	3
	55	17:36	44.420		0.5	140	254	65	34	279	3
	60	17:41	48.8410		0.5	140	252	65	34	279	3
TOTAL			48.8410	48.8410	0.5	140	265.08	62.77	34.00	276.92	3.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**49082.05862**	**49.0820586**

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URS

METHOD 30B

Run No. 9

Date	4/2/2014		Sorbent Trap Number	OL172053	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	8	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	17	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	9:18:00	0.000		1	150	261	77	34	274	3
	5	9:23	7.710		1	150	263	76	34	275	3
	10	9:28	14.120		1	150	264	77	34	274	3
	15	9:33	20.600		1	150	264	77	34	274	3
	20	9:38	27.100		1	150	263	78	34	277	3
	25	12:43	33.150		1	150	261	78	34	268	6
	30	12:48	39.910		1	150	262	78	34	271	6
	35	12:53	46.150		1	150	260	78	34	273	5
	40	12:58	52.900		1	150	261	78	34	273	4
	45	13:03	59.640		1	150	265	78	34	273	4
	50	13:08	66.220		1	150	263	78	34	274	4
	55	13:13	72.630		1	150	261	78	34	272	4
	60	13:18	79.0150		1	150	260	78	34	273	4
TOTAL			79.0150	79.0150	1	150	262.15	77.62	34.00	273.15	4.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**78085.79423**	**78.0857942**

URS

METHOD 30B

Date	4/2/2014		Sorbent Trap Number	OL207681	Meter Number	8002511
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	
Run Number/Side (A/B)	8	B	Tube Heat Set Point (F)		Assumed H_20 %	
Operator	WL		Minutes Per Point		K-factor	
Location Height			Ambient Temp. (F)		O2 %	
Initial Leak Check (L/min @ "Hg)	0.000	22	Static Pressure (" H_20)		CO2%	
Final Leak Check (L/min @ "Hg)	0.000	19	Barometric Pres. (" Hg)	30.12	O2/CO2 Method	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	10:52:00	0.000		1	150	261	80	34	274	5
	5	10:57	6.320		1	150	264	80	34	275	5
	10	11:02	12.480		1	150	263	80	34	274	5
	15	11:07	18.800		1	150	267	80	34	274	5
	20	11:12	24.910		1	150	265	80	34	277	5
	25	12:43	30.990		1	150	266	83	34	268	6
	30	12:48	37.640		1	150	266	84	34	271	6
	35	12:53	44.740		1	150	262	86	34	273	5
	40	12:58	52.090		1	150	263	86	34	273	5
	45	13:03	57.790		1	150	265	86	34	273	5
	50	13:08	64.050		1	150	268	86	34	274	5
	55	13:13	70.220		1	150	267	86	34	272	5
	60	13:18	76.8390		1	150	268	86	34	273	5
TOTAL			76.8390	76.8390	1	150	265.00	83.31	34.00	273.15	5.15
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**74297.41787**	**74.2974179**

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URS

METHOD 30B

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Run No. _____

Date	4/2/2014		Sorbent Trap Number	OL172053	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	9	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	17	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	10:52:00	0.000	0.000	1	150	261	79	34	274	3
	5	10:57	6.150		1	150	264	79	34	275	3
	10	11:02	12.260		1	150	263	79	34	274	3
	15	11:07	18.820		1	150	267	79	34	277	3
	20	11:12	24.730		1	150	265	79	34	277	3
	25	12:43	30.830		1	150	266	81	34	268	6
	30	12:48	37.260	76.827	1	150	266	83	34	271	6
	35	12:53	44.320		1	150	262	84	34	273	5
	40	12:58	51.780		1	150	263	85	34	273	4
	45	13:03	57.960		1	150	265	85	34	273	4
	50	13:08	64.0700		1	150	268	85	34	274	4
	55	13:13	70.4300		1	150	267	85	34	272	4
	60	13:18	76.8270		1	150	268	85	34	273	4
TOTAL			76.8270	76.8270		150	265	82.15384615			
Target Volume	0										
Spike Amount (ng)	100										

Comments:

	Mechanical	Totalizer
Total Volume (L)	**75287.56905**	**75.2875691**

URS

METHOD 30B

Page 1 of _____

Run No. _____

Date	4/2/2014		Sorbent Trap Number	OL207681	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	9	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height	0		Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000		Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000		Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	10:52:00	0.000	0.000	1	150	261	80	34	274	5
	5	10:57	6.320		1	150	264	80	34	275	5
	10	11:02	12.480		1	150	263	80	34	274	5
	15	11:07	18.800		1	150	267	80	34	277	5
	20	11:12	24.910		1	150	265	80	34	277	5
	25	12:43	30.990		1	150	266	83	34	268	6
	30	12:48	37.640	76.839	1	150	266	84	34	271	6
	35	12:53	44.740		1	150	262	86	34	273	5
	40	12:58	52.090		1	150	263	86	34	273	5
	45	13:03	57.790		1	150	265	86	34	273	5
	50	13:08	64.0500		1	150	268	86	34	274	5
	55	13:13	70.2200		1	150	267	86	34	272	5
	60	13:18	76.8390		1	150	268	86	34	273	5
TOTAL			76.8390	76.8390				83.30769231			
Target Volume	0										
Spike Amount (ng)	0										

Comments:

	Mechanical	Totalizer
Total Volume (L)	**74297.41787**	**74.2974179**

URS

METHOD 30B

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Run No. _____

Date	4/2/2014		Sorbent Trap Number	OL211455	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9959	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9959	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	FB	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height	0		Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000		Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000		Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:23:00	0.000	0.000	1	0	0	77			
	5	12:28			1			77			
	10	12:33			1			77			
	15	12:38			1			77			
	20	12:43			1			77			
	25	12:48			1			77			
	30	12:53	75.000	75.000							
TOTAL			75.0000	75.0000		0	0	77			
Target Volume	0										
Spike Amount (ng)	100										

Comments:

	Mechanical	Totalizer
Total Volume (L)	**73928.3382**	**73.9283382**

URS

METHOD 30B

Page 1 of _____

Run No. _____

Date	4/2/2014		Sorbent Trap Number	OL207686	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	FB	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000		Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000		Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:23:00	0.000	0.000	1	0	0	76	0	0	
	5	12:28			1	0	0	76	0	0	
	10	12:33			1	0	0	77	0	0	
	15	12:38			1	0	0	77	0	0	
	20	12:43			1	0	0	77	0	0	
	25	12:48			1	0	0	77	0	0	
	30	12:53	75.000	75.000							
TOTAL			75.0000	75.0000				76.66666667			
Target Volume	0										
Spike Amount (ng)	0										

Comments:

	Mechanical	Totalizer
Total Volume (L)	**73417.19346**	**73.4171935**

PCS Method 30B 2014.xls

Speciated Mercury Summary

Project Name PCS Aurora **Unit** Calciner #2 Stack

Sampling Date	Analysis Date	Sample ID	Trap #	Fraction	ng	Trap Total ng	Sample Volume (Std L)	Fraction Hg Conc (µg/dscm)	Total Hg Conc (µg/dscm)	Average Particulate Conc (µg/dscm)	Average Oxidized Conc (µg/dscm)	Average Elemental Conc (µg/dscm)	Average Hg Conc (µg/dscm)
4/1/2014	4/8/2014	4A	OL213525	Particulate	3.5	1693.4	56.95	0.06	29.74	0.06	0.18	28.11	28.35
				Oxidized	10.4			0.18					
				Elemental	1679.6			29.49					
4/1/2014	4/8/2014	4B	OL213590	Particulate	3.5	1514.0	56.14	0.06	26.97				
				Oxidized	10.4			0.19					
				Elemental	1500.2			26.72					
4/1/2014	4/8/2014	6A	OL213509	Particulate	3.5	819.9	26.05	0.13	31.47	0.13	0.40	29.92	30.45
				Oxidized	10.4			0.40					
				Elemental	806.0			30.94					
4/1/2014	4/8/2014	6B	OL213517	Particulate	3.5	755.5	25.67	0.13	29.44				
				Oxidized	10.4			0.40					
				Elemental	741.6			28.90					
4/2/2014	4/8/2014	7A	OL213506	Particulate	3.5	671.2	20.28	0.17	33.10	0.18	0.51	32.45	33.14
				Oxidized	10.4			0.51					
				Elemental	657.4			32.41					
4/2/2014	4/8/2014	7B	OL213606	Particulate	4.0	677.1	20.40	0.20	33.19				
				Oxidized	10.4			0.51					
				Elemental	662.6			32.48					

URS

METHOD 30B

Run No. 1

Date	4/1/2014		Sorbent Trap Number	OL213525	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	Speiciated		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	4	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height	100		Ambient Temp. (F)		O2 %	15.7	
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%	5.0	
Final Leak Check (L/min @ "Hg)	0.000	22	Barometric Pres. (" Hg)	30.04	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	15:20:00	0.000		1	146	256	67	34	262	18
	5	15:25	5.290		1	146	255	67	34	263	18
	10	15:30	9.950		1	146	250	67	34	264	18
	15	15:35	14.660		1	146	255	67	34	278	18
	20	15:40	19.430		1	146	257	67	34	283	18
	25	15:45	24.120		1	146	252	67	34	284	18
	30	15:50	28.810		1	146	249	67	34	284	18
	35	15:55	33.660		1	146	253	67	34	283	18
	40	16:00	38.220		1	146	256	67	34	283	18
	45	16:05	42.650		1	146	254	67	34	282	18
	50	16:10	47.040		1	146	255	67	34	283	18
	55	16:15	51.650		1	146	253	67	34	283	18
	60	16:20	56.6360		1	146	251	67	34	284	18
TOTAL			56.6360	56.6360	1	146	253.54	67.00	34.00	278.15	18.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**56946.42532**	**56.9464253**

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URS

METHOD 30B

Run No. 1

Date	4/1/2014		Sorbent Trap Number	OL213590	Meter Number	8002511
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884
Sample Type	Speiciated		Probe Heat Set Point (F)		Stack Diameter	
Run Number/Side (A/B)	4	B	Tube Heat Set Point (F)		Assumed H_20 %	
Operator	WL		Minutes Per Point		K-factor	
Location Height			Ambient Temp. (F)		O2 %	15.7
Initial Leak Check (L/min @ "Hg)	0.000	23	Static Pressure (" H_20)		CO2%	5.0
Final Leak Check (L/min @ "Hg)	0.000	24	Barometric Pres. (" Hg)	30.04	O2/CO2 Method	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	15:20:00	0.000		1	146	256	68	34	262	20
	5	15:25	5.170		1	146	255	68	34	263	20
	10	15:30	9.890		1	146	250	68	34	264	20
	15	15:35	14.610		1	146	255	68	34	278	20
	20	15:40	19.390		1	146	257	68	34	283	20
	25	15:45	24.080		1	146	252	68	34	284	20
	30	15:50	28.750		1	146	249	68	34	284	20
	35	15:55	33.600		1	146	253	68	34	283	20
	40	16:00	38.220		1	146	256	68	34	283	20
	45	16:05	42.610		1	146	254	68	34	282	20
	50	16:10	47.000		1	146	255	68	34	283	20
	55	16:15	51.600		1	146	253	68	34	283	20
	60	16:20	56.5710		1	146	251	68	34	284	20
TOTAL			56.5710	56.5710	1	146	253.54	68.00	34.00	278.15	20.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**56137.15728**	**56.1371573**

URS

METHOD 30B

Run No. 2

Date	4/1/2014		Sorbent Trap Number	OL213509	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	Speiciated		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	6	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %	13.7	
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%	6.9	
Final Leak Check (L/min @ "Hg)	0.000	20	Barometric Pres. (" Hg)	30.04	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	18:06:00	0.000		0.25	143	188	65	34	262	5
	5	18:11	3.270		0.25	143	182	65	34	262	5
	10	18:16	6.250		0.25	143	179	65	34	262	5
	15	18:21	9.340		0.25	143	174	65	34	263	5
	20	18:26	12.610		0.25	143	168	65	34	263	6
	25	18:31	15.910		0.25	143	164	65	34	262	6
	30	18:36	19.270		0.25	143	167	65	34	263	6
	35	18:41	22.480		0.25	143	172	66	34	264	6
	40	18:46	25.826		0.25	143	178	67	34	265	6
TOTAL			25.8260	25.8260	0.25	143	174.67	65.33	34.00	262.89	5.56
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**26049.99001**	**26.04999**

URS

METHOD 30B

Run No. 2

Date	4/1/2014		Sorbent Trap Number	OL213517	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884	
Sample Type	Speiciated		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	6	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %	13.7	
Initial Leak Check (L/min @ "Hg)	0.000	23	Static Pressure (" H_20)		CO2%	6.9	
Final Leak Check (L/min @ "Hg)	0.000	23	Barometric Pres. (" Hg)	30.04	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	18:06:00	0.000		0.25	143	188	66	34	262	8
	5	18:11	3.240		0.25	143	182	66	34	262	8
	10	18:16	6.390		0.25	143	179	66	34	262	8
	15	18:21	9.620		0.25	143	174	66	34	263	8
	20	18:26	12.930		0.25	143	168	66	34	263	8
	25	18:31	16.190		0.25	143	164	66	34	262	8
	30	18:36	19.450		0.25	143	167	66	34	263	8
	35	18:41	22.580		0.25	143	172	68	34	264	8
	40	18:46	25.799		0.25	143	178	70	34	265	8
TOTAL			25.7990	25.7990	0.25	143	174.67	66.67	34.00	262.89	8.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**25666.00127**	**25.6660013**

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URS

METHOD 30B

Run No. 3

Date	4/2/2014		Sorbent Trap Number	OL213506	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9996	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9996	
Sample Type	Speiciated		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	7	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %	13.5	
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%	7.1	
Final Leak Check (L/min @ "Hg)	0.000	15	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	8:25:00	0.000		0.25	154	152	69	35	269	7
	5	8:30	4.460		0.25	154	156	69	35	269	7
	10	8:35	7.820		0.25	154	157	70	35	270	7
	15	8:40	11.280		0.25	154	147	71	35	273	8
	20	8:45	14.450		0.25	154	148	72	35	273	8
	25	8:50	17.490		0.25	154	152	72	35	273	8
	30	8:55	20.259		0.25	154	152	72	35	272	8
TOTAL			20.2590	20.2590	0.25	154	152.00	70.71	35.00	271.29	7.57
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**20281.25711**	**20.2812571**

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00060

URS

METHOD 30B

Run No. 3

Date	4/2/2014		Sorbent Trap Number	OL213606	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	0.9884	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	0.9884	
Sample Type	Speiciated		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	7	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %	13.5	
Initial Leak Check (L/min @ "Hg)	0.000	23	Static Pressure (" H_20)		CO2%	7.1	
Final Leak Check (L/min @ "Hg)	0.000	17	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	8:25:00	0.000		0.25	154	152	68	35	269	9
	5	8:30	4.590		0.25	154	156	68	35	269	9
	10	8:35	7.960		0.25	154	157	68	35	270	9
	15	8:40	11.280		0.25	154	147	69	35	273	9
	20	8:45	14.420		0.25	154	148	70	35	273	9
	25	8:50	17.590		0.25	154	152	70	35	273	9
	30	8:55	20.543		0.25	154	152	70	35	272	9
TOTAL			20.5430	20.5430	0.25	154	152.00	69.00	35.00	271.29	9.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**20401.08209**	**20.4010821**

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Run averages corrected for bias

Operator: PAT

Plant Name: PCS Aurora

Location: Calciner #3

Run	O2 %	CO2 %
1	14.7	6.1
2	15.1	5.7
3	14.2	6.5
4	15.3	5.6

Test Run 1 Begin. STRATA Version 3.2
Operator: PAT
Plant Name PCS Aurora
Location: #3 Calciner

		O2 %	CO2 %
4/4/2014	10:30:55	14.647	6.007
4/4/2014	10:31:55	14.621	6.006
4/4/2014	10:32:55	14.601	6.006
4/4/2014	10:33:55	14.588	6.009
Average of Test Run		14.613	6.007

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Test Run 2 Begin. STRATA Version 3.2
Operator: PAT
Plant Name PCS Aurora
Location: #3 Calciner

		O2 %	CO2 %
4/4/2014	10:49:52	15.01	5.637
4/4/2014	10:50:52	14.978	5.635
4/4/2014	10:51:52	14.954	5.637
4/4/2014	10:52:52	14.948	5.636
Average of Test Run		14.968	5.636

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Test Run 3 Begin. STRATA Version 3.2
Operator: PAT
Plant Name PCS Aurora
Location: #3 Calciner

		O2 %	CO2 %
4/4/2014	13:45:53	13.955	6.482
4/4/2014	13:46:53	13.962	6.481
4/4/2014	13:47:53	13.967	6.478
4/4/2014	13:48:53	13.97	6.482
4/4/2014	13:49:53	13.973	6.478
4/4/2014	13:50:53	13.977	6.473
4/4/2014	13:51:53	13.974	6.48
4/4/2014	13:52:53	13.979	6.467
4/4/2014	13:53:53	13.988	6.468
4/4/2014	13:54:53	13.988	6.467
Average of Test Run		13.974	6.475

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Test Run 4 Begin. STRATA Version 3.2
Operator: PAT
Plant Name PCS Aurora
Location: #3 Calciner

		O2 %	CO2 %
4/4/2014	15:39:26	15.123	5.558
4/4/2014	15:40:26	15.115	5.566
4/4/2014	15:41:26	15.115	5.564
4/4/2014	15:42:26	15.118	5.557
4/4/2014	15:43:26	15.122	5.558
4/4/2014	15:44:26	15.117	5.561
Average of Test Run		15.118	5.561

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RUN 1 30B BAG

Test Run 1 STRATA Version 3.2

	O2 %	CO2 %
Begin calculating run averages		
04-01-2014 15:04:33	15.750	5.101
04-01-2014 15:05:33	15.756	5.110
04-01-2014 15:06:33	15.756	5.112
04-01-2014 15:07:33	15.760	5.102
Run Averages	O2 %	CO2 %
04-01-2014 15:07:34	15.755	5.106

Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner
Test Run 1 End

Final System Bias Check, Run 1 STRATA Version 3.2
Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner

RUN1 30B BAG

	Reference Cylinder Numbers Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time 04-01-2014 15:12:34 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	0.095	-0.037
Zero Avg	0.078	0.034
Zero Bias%	0.1%	0.4%
Zero Drift%	0.1%	0.0%
Span Ref Cyl	10.470	9.760
Span Cal	10.440	9.646
Span Avg	10.456	9.688
Span Bias%	0.1%	0.2%
Span Drift%	0.0%	0.0%
Ini Zero Avg	0.058	0.031
Ini Span Avg	10.457	9.687
Run Avg	15.755	5.106
Co	0.068	0.033
Cm	10.457	9.688
Correct Avg	15.810	5.128

System Bias Check End

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Test Run 2 STRATA Version 3.2

	O2 %	CO2 %
Begin calculating run averages		
04-01-2014 15:15:00	15.701	5.223
04-01-2014 15:16:00	15.699	5.235
04-01-2014 15:17:00	15.706	5.227
04-01-2014 15:18:00	15.702	5.228
Run Averages	O2 %	CO2 %
04-01-2014 15:18:25	15.702	5.229

Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner
Test Run 2 End

RUN 2 30B BAG

Final System Bias Check, Run 2 STRATA Version 3.2
Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner

RUN 2 30B BAG

	Reference Cylinder Numbers	
	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time 04-01-2014 15:22:34 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	0.095	-0.037
Zero Avg	0.061	0.042
Zero Bias%	0.2%	0.4%
Zero Drift%	-0.1%	0.0%
Span Ref Cyl	10.470	9.760
Span Cal	10.440	9.646
Span Avg	10.449	9.683
Span Bias%	0.0%	0.2%
Span Drift%	0.0%	0.0%
Ini Zero Avg	0.078	0.034
Ini Span Avg	10.456	9.688
Run Avg	15.702	5.229
Co	0.069	0.038
Cm	10.452	9.686
Correct Avg	15.763	5.251

System Bias Check End

Test Run 3 STRATA Version 3.2

	O2	CO2
	%	%
Begin calculating run averages		
04-01-2014 15:26:04	15.760	5.106
04-01-2014 15:27:04	15.759	5.124
04-01-2014 15:28:04	15.758	5.117
04-01-2014 15:29:04	15.758	5.110
Run Averages	O2	CO2
	%	%
04-01-2014 15:29:12	15.758	5.116

Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner
Test Run 3 End

RUN 3 30B BAG

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Final System Bias Check, Run 3 STRATA Version 3.2
Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner

	Reference Cylinder Numbers Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

RUN3 30B BMG

Date/Time 04-01-2014 15:34:06 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	0.095	-0.037
Zero Avg	0.053	0.041
Zero Bias%	0.2%	0.4%
Zero Drift%	0.0%	0.0%
Span Ref Cyl	10.470	9.760
Span Cal	10.440	9.646
Span Avg	10.451	9.689
Span Bias%	0.1%	0.2%
Span Drift%	0.0%	0.0%
Ini Zero Avg	0.061	0.042
Ini Span Avg	10.449	9.683
Run Avg	15.758	5.116
Co	0.057	0.041
Cm	10.450	9.686
Correct Avg	15.817	5.135

System Bias Check End

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Test Run 4 STRATA Version 3.2

	O2	CO2
	%	%
Begin calculating run averages		
04-01-2014 16:41:08	15.696	4.960
04-01-2014 16:42:08	15.700	4.966
04-01-2014 16:43:08	15.698	4.965
04-01-2014 16:44:08	15.697	4.970
Run Averages	O2	CO2
	%	%
04-01-2014 16:44:12	15.698	4.965

Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner
Test Run 4 End

Final System Bias Check, Run 4 STRATA Version 3.2
Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner

	Reference Cylinder Numbers	
	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time 04-01-2014 16:48:48 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	0.095	-0.037
Zero Avg	0.015	0.028
Zero Bias%	0.4%	0.3%
Zero Drift%	-0.2%	-0.1%
Span Ref Cyl	10.470	9.760
Span Cal	10.440	9.646
Span Avg	10.397	9.648
Span Bias%	0.2%	0.0%
Span Drift%	-0.3%	-0.2%
Ini Zero Avg	0.053	0.041
Ini Span Avg	10.451	9.689
Run Avg	15.698	4.965
Co	0.034	0.035
Cm	10.424	9.668
Correct Avg	15.784	4.995

System Bias Check End

RUN 5 30B

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Test Run 5 STRATA Version 3.2

	O2 %	CO2 %
Begin calculating run averages		
04-02-2014 09:04:03	13.713	6.862
04-02-2014 09:05:03	13.701	6.867
04-02-2014 09:06:04	13.702	6.866
04-02-2014 09:07:04	13.695	6.869
Run Averages	O2 %	CO2 %
04-02-2014 09:07:54	13.702	6.867

Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner
Test Run 5 End

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Test Run 6 STRATA Version 3.2

	O2 %	CO2 %
Begin calculating run averages		
04-02-2014 15:50:16	13.496	7.095
04-02-2014 15:51:16	13.489	7.105
04-02-2014 15:52:16	13.487	7.102
04-02-2014 15:53:16	13.485	7.106
Run Averages	O2 %	CO2 %
04-02-2014 15:54:01	13.489	7.103

Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner
Test Run 6 End

Final System Bias Check, Run 5 STRATA Version 3.2
Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner

RUN 8 30B

	Reference Cylinder Numbers Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

flow Run 6 4.22.14

Date/Time 04-02-2014 09:12:05 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	0.095	-0.037
Zero Avg	0.028	0.024
Zero Bias%	0.3%	0.3%
Zero Drift%	0.1%	0.0%
Span Ref Cyl	10.470	9.760
Span Cal	10.440	9.646
Span Avg	10.425	9.653
Span Bias%	0.1%	0.0%
Span Drift%	0.1%	0.0%
Ini Zero Avg	0.015	0.028
Ini Span Avg	10.397	9.648
Run Avg	13.702	6.867
Co	0.022	0.026
Cm	10.411	9.651
Correct Avg	13.787	6.937

System Bias Check End

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Final System Bias Check, Run 6 STRATA Version 3.2
Operator: PAT
Plant Name: PCS Aurora
Location: #2 Calciner

Run 9 30B
Flow Run 7

	Reference Cylinder Numbers	
	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time 04-02-2014 15:59:23 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	0.095	-0.037
Zero Avg	0.049	0.007
Zero Bias%	0.2%	0.2%
Zero Drift%	0.1%	-0.1%
Span Ref Cyl	10.470	9.760
Span Cal	10.440	9.646
Span Avg	10.409	9.615
Span Bias%	0.2%	0.2%
Span Drift%	-0.1%	-0.2%
Ini Zero Avg	0.028	0.024
Ini Span Avg	10.425	9.653
Run Avg	13.489	7.103
Co	0.039	0.016
Cm	10.417	9.634
Correct Avg	13.569	7.192

System Bias Check End

URS

Spiked TUBES

Plant Name	PCS	Date	4/1/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 23 "Hg
Location (Source)	Col #2 stack	Run	4		
Meter ID	800 2547 / 0.9996 3311 / 0.9884	Operator	WL	Final Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 24 "Hg
Sorbent Trap IDs	1) OL213525; 2) OL213590	Bar. Press. (in. H_2O)		Third Bed Spike Level	1) N/A; 2) N/A
		Elevation (relative to Barometer) (ft)			

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)		0	1					67	18
2)	1520	0	1	1	256	262	262	68	20
1)		5.29	1					67	18
2)	1525	5.17	1	1	255	265	263	68	20
1)		9.95	1					67	18
2)	1530	9.89	1	1	250	260	264	68	20
1)		14.66	1					67	18
2)	1535	14.61	1	1	255	262	278	68	20
1)		19.43	1					67	18
2)	1540	19.39	1	1	257	263	283	68	20
1)		24.12	1					67	18
2)	1545	24.08	1	1	252	261	284	68	20
1)		28.81	1					67	18
2)	1550	28.75	1	1	249	258	284	68	20
1)		33.66	1					67	18
2)	1555	33.60	1	1	253	259	283	68	20
1)		38.22	1					67	18
2)	1600	38.22	1	1	256	262	283	68	20
1)		42.65	1					67	18
2)	1605	42.61	1	1	254	264	282	68	20
1)		47.04	1					67	18
2)	1610	47.00	1	1	255	261	283	68	20
1)		51.65	1					67	18
2)	1615	51.60	1	1	253	260	283	68	20
1)		56.636	1					67	18
2)	1620	56.571	1	1	251	257	284	68	20
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 139 - 146
Chiller Temp °F 34

SOP-35: Measure by Sorbent Trap Method 320

URS

Spectated TUBES

Plant Name	PCS	Date	4/1/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 23 "Hg
Location (Source)	Cal #2 stack	Run	6		
Meter ID	800 ~~2547~~ 5317 / 0.9996 ~~0.9984~~	Operator	WL	Final Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 23 "Hg
Sorbent Trap IDs	1) OL213509; 2) OL213517	Bar. Press. (in. H_2O)			
		Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) N/A; 2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)		0	.25					65	5
2)	1806	0	.25	.25	189	187	262	66	8
1)		3.27	.25					65	5
2)	1811	3.24	.25	.25	182	184	262	66	8
1)		6.25	.25					65	5
2)	1816	6.39	.25	.25	179	181	262	66	8
1)		9.34	.25					65	5
2)	1821	9.62	.25	.25	174	176	263	66	8
1)		12.61	.25					65	6
2)	1826	12.93	.25	.25	168	170	263	66	8
1)		15.91	.25					65	6
2)	1831	16.19	.25	.25	164	166	262	66	8
1)		19.27	.25					65	6
2)	1836	19.45	.25	.25	167	169	263	66	8
1)		22.48	.25					66	6
2)	1841	22.58	.25	.25	172	175	264	68	8
1)		25.826	.25					67	6
2)	1846	25.799	.25	.25	178	180	265	70	8
1)			.25					69	6
2)	1851		.25	.25			264	70	8
1)			.25					69	6
2)	1856		.25	.25			263	72	8
1)			.25					69	6
2)	1901		.25	.25			262	72	8
1)			.25					69	6
2)	1906		.25	.25			264	72	8
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 143
Chiller Temp °F 34

SDS-35: Mercury by Sorbent Trap - Method 30B

URS

Plant Name PCS	Date 4/2/14	Page 1 of 1	
Project Number	Condition	Initial Leak Rate	1) 0 @ 20 "Hg
Location (Source) Cal #2 stack	Run 7		2) 0 @ 23 "Hg
Meter ID 800 2547 / 0.9996 2511 / 0.9884	Operator WL	Final Leak Rate	1) 0 @ 15 "Hg
Sorbent Trap IDs 1) OL213506	Bar. Press. (in. H_2O)		2) 0 @ 17 "Hg
2) OL213606	Elevation (relative to Barometer) (ft)	Third Bed Spike Level	1) N/A
			2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	825	0	.25	.25	152	150	269	69	7
2)		0	.25					68	9
1)	830	4.46	.25	.25	156	152	269	69	7
2)		4.59	.25					68	9
1)	835	7.82	.25	.25	157	154	270	70	7
2)		7.96	.25					68	9
1)	840	11.28	.25	.25	147	152	273	71	8
2)		11.28	.25					69	9
1)	845	14.45	.25	.25	148	151	273	72	8
2)		14.42	.25					70	9
1)	850	17.49	.25	.25	152	154	273	72	8
2)		17.59	.25					70	9
1)	855	20.259	.25	.25	152	154	272	72	8
2)		20.543	.25					70	9
1)									
2)									
1)									
2)									
1)									
2)									
1)									
2)									
1)									
2)									
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 154
Chiller Temp °F 35

SDS-35: Mercury by Sorbent Trap – Method 30B

URS

Plant Name	PCS	Date	4/1/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 20 "Hg
Location (Source)	Cal #2 stack	Run	1		2) 0 @ 22 "Hg
Meter ID	80c ~~2547~~ 2511 / ~~2.9996~~ 2.9884	Operator	WL	Final Leak Rate	1) 0 @ 16 "Hg
Sorbent Trap IDs	1) OL172024	Bar. Press. (in. H_2O)			2) 0 @ 19 "Hg
	2) OL207693	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) 2200ng
					2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1135	0	1	1	253	253	261	64	2
2)		0	1					66	5
1)	1140	6.48	1	1	254	254	261	64	2
2)		6.82	1					66	5
1)	1145	12.31	1	1	286	285	263	65	3
2)		13.11	1					67	5
1)	1150	18.40	1	1	290	287	267	65	3
2)		19.12	1					67	5
1)	1155	24.09	1	1	265	284	267	65	3
2)		25.55	1					66	5
1)	1200	30.34	1	1	251	282	264	65	3
2)		31.09	1					66	5
1)	1205	36.46	1	1	283	285	263	65	3
2)		38.28	1					66	5
1)	1216	42.39	1	1	298	287	266	65	3
2)		44.49	1					66	5
1)	1215	48.94	1	1	272	285	266	65	3
2)		50.62	1					65	5
1)	1220	55.41	1	1	261	284	265	65	3
2)		56.98	1					66	5
1)	1225	61.97	1	1	272	282	262	65	3
2)		63.33	1					66	5
1)	1230	68.35	1	1	298	284	265	65	3
2)		69.47	1					66	5
1)	1235	74.792	1	1	274	283	266	65	3
2)		75.639	1					66	5
1)									
2)									
1)									
2)									

Comments: Stack temp °F 146
Chiller temp °F 34

URS

Plant Name PCS	Date 4/1/14	Page 1 of 1	
Project Number	Condition	Initial Leak Rate	1) 0 @ 22 "Hg
Location (Source) C91 #2 Stack	Run 2		2) 0 @ 24 "Hg
Meter ID 8002547 / 0.9996 3511 / 0.9884	Operator WL	Final Leak Rate	1) 0 @ 16 "Hg
Sorbent Trap IDs 1) OL172017	Bar. Press. (in. H_2O)		2) 0 @ 18 "Hg
2) OL207680	Elevation (relative to Barometer) (ft)	Third Bed Spike Level	1) 2200 ng
			2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)		0	1					66	3
2)	1250	0	1	1	284	287	259	67	5
1)		6.73	1					66	3
2)	1255	6.92	1	1	284	286	260	67	5
1)		13.16	1					66	3
2)	1300	13.29	1	1	291	285	263	67	5
1)		19.74	1					65	3
2)	1305	19.83	1	1	261	284	263	66	5
1)		26.47	1					65	3
2)	1310	26.48	1	1	271	283	264	66	5
1)		32.87	1					65	3
2)	1315	32.93	1	1	286	287	262	66	5
1)		39.16	1					65	3
2)	1320	39.32	1	1	294	285	264	66	5
1)		45.67	1					65	3
2)	1325	45.68	1	1	288	284	265	66	5
1)		52.36	1					65	3
2)	1330	52.22	1	1	272	283	266	66	5
1)		58.59	1					65	3
2)	1335	58.39	1	1	277	284	263	66	5
1)		65.04	1					65	3
2)	1340	65.13	1	1	269	285	264	66	5
1)		71.39	1					65	3
2)	1345	71.44	1	1	280	287	264	66	5
1)		78.000	1					65	3
2)	1350	77.973	1	1	281	286	264	66	5
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 146
Chiller Temp °F 34

SDS-35: Mercury by Sorbent Trap - Method 30B

URS

Plant Name	PCS	Date	4/1/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 20 "Hg
Location (Source)	Cal #2 stack	Run	3		2) 0 @ 23 "Hg
Meter ID	8002547 / 0.9996 ~~2511 / 0.9984~~	Operator	WL	Final Leak Rate	1) 0 @ 15 "Hg
Sorbent Trap IDs	1) OL172033	Bar. Press. (in. H_2O)			2) 0 @ 18 "Hg
	2) OL207655	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) 2200 NG
					2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1405	0	1	1	280	284	263	64	3
2)		0	1					65	5
1)	1410	6.82	1	1	288	283	262	64	3
2)		6.94	1					65	5
1)	1415	13.30	1	1	288	284	262	64	3
2)		13.62	1					65	5
1)	1420	19.91	1	1	272	283	263	65	3
2)		20.42	1					65	5
1)	1425	26.48	1	1	273	283	262	65	3
2)		27.05	1					65	5
1)	1430	32.94	1	1	264	282	263	65	3
2)		33.55	1					65	5
1)	1435	39.27	1	1	289	284	264	65	3
2)		39.85	1					65	5
1)	1440	45.91	1	1	289	284	263	65	3
2)		46.16	1					65	5
1)	1445	52.67	1	1	264	283	263	64	3
2)		52.56	1					65	5
1)	1450	59.70	1	1	271	284	264	64	3
2)		59.41	1					65	5
1)	1455	65.85	1	1	283	282	263	64	3
2)		65.50	1					65	5
1)	1500	72.14	1	1	291	283	263	64	3
2)		71.74	1					65	5
1)	1505	78.624	1	1	288	284	263	64	3
2)		78.192	1					65	5
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 141
Chiller Temp °F 34

SDS-35: Mercury by Sorbent Trap - Method 30B

URS

Plant Name	PCS	Date	4/1/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 23 "Hg
Location (Source)	Col #2 stack	Run	5		
Meter ID	~~2547 / 2.9996~~ 2511 / 0.9884	Operator	WL	Final Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 23 "Hg
Sorbent Trap IDs	1) OL172029	Bar. Press. (in. H_2O)		Third Bed Spike Level	1) 2200 ng
	2) OL207643	Elevation (relative to Barometer) (ft)			2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)		0	.5					62	1
2)	1641	0	.5	.5	270	284	258	63	3
1)		4.27	.5					62	1
2)	1646	4.51	.5	.5	270	281	260	63	3
1)		7.95	.5					62	1
2)	1651	8.42	.5	.5	261	262	258	63	3
1)		12.62	.5					61	1
2)	1656	13.61	.5	.5	287	287	258	62	3
1)		16.09	.5					62	1
2)	1701	16.33	.5	.5	269	283	261	62	3
1)		20.14	.5					61	1
2)	1706	20.27	.5	.5	274	284	261	62	3
1)		24.40	.5					61	1
2)	1711	24.45	.5	.5	259	282	262	62	3
1)		28.48	.5					61	1
2)	1716	28.40	.5	.5	261	283	259	60	3
1)		32.87	.5					61	1
2)	1721	32.91	.5	.5	258	284	262	62	3
1)		37.40	.5					61	1
2)	1726	36.89	.5	.5	273	280	262	62	3
1)		40.62	.5					62	1
2)	1731	40.25	.5	.5	258	281	263	63	3
1)		44.85	.5					63	1
2)	1736	44.42	.5	.5	254	283	262	65	3
1)		48.991	.5					63	1
2)	1741	48.841	.5	.5	252	280	261	65	3
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 140
Chiller Temp °F 34

SDS-35: Mercury by Sorbent Trap - Method 30B

URS

Plant Name	PCS	Date	4/2/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 26 "Hg
Location (Source)	Cal #2 Stack	Run	8		2) 0 @ 22 "Hg
Meter ID	800 2547 / 0.9996 2511 / 0.9884	Operator	WL	Final Leak Rate	1) @ "Hg
Sorbent Trap IDs	1) OL211456	Bar. Press. (in. H_2O)			2) @ "Hg
	2) OL207687	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) 2200 ng
					2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	918	0	1	1	261	250	272	77	3
2)		0	1					72	5
1)	923	7.71	1	1	263	250	273	76	3
2)		8.80	1					73	5
1)	928	14.12	1	1	264	250	275	77	3
2)		14.88	1					73	5
1)	933	20.60	1	1	264	250	274	77	3
2)		21.74	1					73	5
1)	938	27.10	1	1	263	250	276	78	3
2)		29.12	1					75	5
1)	943	33.15	1	1	261	250	278	78	3
2)		35.01	1					75	5
1)	948	39.91	1	1	262	250	278	78	3
2)		41.38	1					75	5
1)	953	46.15	1	1	260	250	279	78	3
2)		47.46	1					75	5
1)	958	52.90	1	1	261	250	279	78	3
2)		53.40	1					75	5
1)	1003	59.64	1	1	265	250	279	78	3
2)		59.51	1					76	5
1)	1008	66.22	1	1	263	250	279	78	3
2)		65.80	1					76	5
1)	1013	72.63	1	1	261	250	279	78	3
2)		71.98	1					76	5
1)	1018	79.015	1	1	260	250	279	78	3
2)		77.954	1					76	5
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 150
Chiller Temp °F 34
*30b A and B samples were moist. Samples came out of tubes clumpy

SDS-35: Mercury by Sorbent Trap - Method 30B

URS

Plant Name	PCS	Date	4/2/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 22 "Hg
Location (Source)	Cal #2 Stack	Run	9		
Meter ID	800 ~~2547~~ 2511 / ~~0.9996~~ 0.9884	Operator	WL	Final Leak Rate	1) 0 @ 17 "Hg; 2) 0 @ 19 "Hg
Sorbent Trap IDs	1) OL172053	Bar. Press. (in. H_2O)		Third Bed Spike Level	1) 2200 ng
	2) OL207681	Elevation (relative to Barometer) (ft)			2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Probe	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)		0	1					79	3
2)	1052	0	1	1	261	264	274	80	5
1)		6.15	1					79	3
2)	1057	6.32	1	1	264	263	275	80	5
1)		12.26	1					79	3
2)	1102	12.48	1	1	263	268	274	80	5
1)		18.82	1					79	3
2)	1107	18.80	1	1	267	265	277	80	5
1)		24.73	1					79	3
2)	1112	24.91	1	1	265	267	277	80	5
1)	1243	30.83	1					81	6
2)	~~H17~~	30.99	1	1	266	266	268	83	6
1)	1248	37.26	1					83	6
2)	~~H22~~	37.64	1	1	266	267	271	84	6
1)	1253	44.32	1					84	5
2)	~~H27~~	44.74	1	1	262	268	273	86	5
1)	1258	51.78	1					85	4
2)	~~H32~~	~~52~~.09	1	1	263	268	273	86	5
1)	~~1303~~	57.96	1					85	4
2)	~~H37~~	57.79	1	1	265	268	273	86	5
1)	1308	64.07	1					85	4
2)	~~H42~~	64.05	1	1	268	270	274	86	5
1)	1313	70.43	1					85	4
2)	~~H47~~	70.22	1	1	267	267	272	86	5
1)	1318	76.827	1					85	4
2)	~~H52~~	76.839	1	1	268	269	273	86	5
1)									
2)									
1)									
2)									

Comments: Stack Temp °F 150 / Chiller Temp °F 34

Probe run 11:15 lost ~~control~~ visible water droplets in tube A

Fed

SDS-35: Mercury by Sorbent Trap - Method 30B

URS

Plant Name	PCS	Date	4/2/14	Page	1 of 1
Project Number		Condition		Initial Leak Rate	1) 0 @ 20 "Hg
Location (Source)	Cal #2 Stack	Run	10		2) 2 @ 23 "Hg
Meter ID	800 2347 / 0.9996 2311 / 0.9889	Operator	WL	Final Leak Rate	1) @ "Hg
Sorbent Trap IDs	1) OL2/1455	Bar. Press. (in. H_2O)			2) @ "Hg
	2) OL20M686	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) 2200 ng
					2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F)				Vacuum (in. Hg)
					Sorbent	Probe	Heat-Traced Line	Meter	
1)		0	1	1					
2)		0	1						
1)									
2)									
1)									
2)									
1)									
2)									
1)									
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2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

URS — FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: Pabst Corp	Project #: 31829746.00001	Date: 4-4-14	Operator(s): WL
Location: ~~Aurora, NC~~ 2 stacks	Condition: #3 CALCINER	Run #: 1	Duration (min): 60
DGM#: N-54	CF (Yd): 0.9808	$\Delta H_@$: 1.907	Cp: 0.84
K-Factor:	P_{bar} ("Hg): 29.89	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.000	Vac. ("Hg): 12	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 10	Duct Width ("): NA	Duct Length ("): NA
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓		

Fyrite/Orsat O_2 (%/time) 14.7 % (CEMS)	Fyrite/Orsat CO_2 (%/time) 6.05% (CEMS)	Nozzle D1 (") Ø: 0.275
Fyrite/Orsat O_2 (%/time) % (:)	Fyrite/Orsat CO_2 (%/time) % (:)	Nozzle D2 (") ⊘: 0.277
Fyrite/Orsat O_2 (%/time) % (:)	Fyrite/Orsat CO_2 (%/time) % (:)	Nozzle D3 (") ⊖: 0.276
		Average Nozzle D ("): 0.276

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A 1	905	0	756.075	.41	1.59	149	257	~~A/B~~	60	87	87	3
2		2.5	757.66	.46	1.70	153	259	~~A/B~~	56	87	87	3
3	910	5	759.32	.48	~~1.86~~	~~1.49~~	257		53	88	88	5
4		7.5	761.03	.44	1.85	143	255		53	88	88	5
5	915	10	762.71	.44	1.60	153	256		50	88	88	5
6		12.5	764.34	.43	1.56	153	257		50	89	88	5
7	920	15	765.97	.28	1.16	144	255		49	89	89	5
8		17.5	767.53	.25	.91	154	256		50	89	88	5
9	925	20	768.84	.27	.98	154	256		54	91	89	5
10		22.5	770.15	.28	1.10	148	261		56	92	89	6
11	930	25	771.56	.23	.83	157	259		56	92	90	6
B 12		27.5	772.85	.24	.87	158	259		56	92	90	5
~~B 1~~	935	30	774.193				Port	Change				
A 1	946		774.193	.41	1.49	155	255		60	92	92	5
2		32.5	776.01	.39	1.62	144	257		58	93	92	4
3	951	35	777.68	.32	1.16	154	258		58	93	92	3
4		37.5	779.35	.35	1.27	155	259		57	93	93	3
5	956	40	780.81	.26	1.03	147	260		57	94	93	3
6		42.5	782.19	.38	1.38	154	258		57	94	93	3
7	1001	45	783.75	.31	1.42	154	256		56	95	93	3
8		47.5	785.18	.29	1.19	145	259		56	97	94	3
9	1006	50	786.69	.31	1.12	153	258		57	95	94	3
10		52.5	788.07	.30	1.14	150	259		57	96	94	3
11	1011	55	789.43	.28	1.15	145	259		58	96	94	3
A 12		57.5	791.00	.26	.94	154	258		58	96	94	2
	1016	60	792.194									

COMMENTS

URS	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: Potash Corp	Project #: 31829746.00001	Date: 4/3/14
Location: Aurora, NC	Condition: #3 Calciner	Run #: 1

Method 4 Moisture Determination

Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	697.9	931.8	
2	DI H_2O	100	GS	661.8	673.9	
3	Empty	--	MOD	630.1	656.5	
4	Silica Gel	--	MOD	895.4	920.5	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse) Cont 1	61.9	559.4	497.5
CONT 2	62.2	330.7	268.5
			766.0

COMMENTS:

URS — FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 318297746.00001	Date: 4-4-14	Operator(s): WL
Location: Cal #3 stack	Condition:	Run #: 2	Duration (min): 60
DGM#: N-54	CF (Yd): 0.9808	$\Delta H_@$: 1.907	Cp: 0.84
K-Factor:	P_{bar} ("Hg): 29.89	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 12	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 9	Duct Width ("): NA		Duct Length ("): NA
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓			Nozzle D1 (") Ø: 0.275
Fyrite/Orsat O_2 (%/time) 15.1 % (CEMS)		Fyrite/Orsat CO_2 (%/time) 5.7 % (CEMS)			Nozzle D2 (") ⊘: 0.277
Fyrite/Orsat O_2 (%/time) % (:)		Fyrite/Orsat CO_2 (%/time) % (:)			Nozzle D3 (") ⊖: 0.276
Fyrite/Orsat O_2 (%/time) % (:)		Fyrite/Orsat CO_2 (%/time) % (:)			Average Nozzle D ("): 0.276

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A 1	1106	0	792.219	.38	1.42	151	250		61	98	99	3
2		2.5	793.84	.36	1.31	156	257		56	98	99	3
3	1111	5	795.42	.37	1.45	148	251		51	98	99	3
4		7.5	797.04	.34	1.33	148	255		52	99	99	3
5	1116	10	798.64	.35	1.27	156	255		52	99	99	3
6		12.5	800.17	.37	1.41	150	260		52	100	99	3
7	1121	15	801.77	.34	1.23	155	259		52	100	99	3
8		17.5	803.24	.30	1.09	154	258		52	100	99	3
9	1126	20	804.73	.29	1.12	149	255		54	101	100	4
10		22.5	806.11	.27	.99	152	258		54	101	100	4
11	1131	25	807.48	.32	1.16	154	256		55	102	101	4
12		27.5	808.68	.23	.87	150	259		56	102	101	4
	1136	30	810.245			Post Change						
B 1	1143		810.245	.44	1.73	148	257		58	101	102	5
2		32.5	811.96	.48	1.74	157	262		45	101	102	5
3	1148	35	813.68	.43	1.71	147	260		44	102	102	5
4		37.5	815.40	.42	1.52	154	252		44	102	101	6
5	1153	40	817.07	.45	1.63	156	247		44	102	101	6
6		42.5	818.78	.43	1.61	151	255		43	102	101	6
7	1158	45	820.51	.30	1.11	152	258		44	102	101	5
8		47.5	822.01	.28	1.01	156	251		46	102	101	5
9	1203	50	823.39	.25	.91	155	252		49	101	101	5
10		52.5	824.68	.24	.87	153	255		49	101	101	5
11	1208	55	825.97	.24	.87	158	255		49	102	101	5
12		57.5	827.27	.20	.76	150	257		49	102	101	5
	1213	60	828.476									

COMMENTS

URS	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: POTASH CORP	Project #: 31829746.00001	Date: 4-4-14
Location: AURORA, NC	Condition: #3 CALCINER	Run #: 2

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	607.4	861.2	
2	DI H_2O	100	GS	797.4	850.1	
3	Empty	--	MOD	662.2	665.1	
4	Silica Gel	--	MOD	919.1	929.3	
Sum						

Recovery Container Weights		Tare (g)	Final (g)	Gain (g)
Filter (no weights)				
PNR & Impinger Catch (DI H_2O Rinse)	CONT. 1	62.1	588.8	526.7
	CONT. 2	61.9	331.4	269.5
				796.2

COMMENTS:

URS — FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 318297486.0000	Date: 4/14/14	Operator(s): WL
Location: Cal #3 stack	Condition:	Run #: 3	Duration (min): 60
DGM#: N-54	CF (Yd): 0.9808	$\Delta H_{@}$: 1.907	Cp: 0.84
K-Factor:	P_{bar} ("Hg):	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 13	Source Height (ft):	Duct Diameter ("):
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 8	Duct Width ("):	Duct Length ("):

Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: 0.275
Fyrite/Orsat O_2 (%/time) 14.2 % (CEMS)		Fyrite/Orsat CO_2 (%/time) 6.5 % (CEMS)	Nozzle D2 (") ⊘: 0.277
Fyrite/Orsat O_2 (%/time) % (:)		Fyrite/Orsat CO_2 (%/time) % (:)	Nozzle D3 (") ⊖: 0.276
Fyrite/Orsat O_2 (%/time) % (:)		Fyrite/Orsat CO_2 (%/time) % (:)	Average Nozzle D ("): 0.276

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B1	1300	0	828.619	.40	1.57	148	251		60	99	100	3
2		2.5	830.08	.43	1.56	156	254		57	99	100	3
3	1305	5	831.74	.44	1.60	153	257		52	99	100	3
4	1310	7.5	833.41	.40	1.64	145	254		51	99	100	4
5		10	835.08	.43	1.56	153	259		51	100	100	4
6	1315	12.5	836.77	.46	1.72	151	254		52	101	101	5
7		15	838.53	.27	1.07	147	263		53	102	101	4
8		17.5	840.08	.28	1.01	156	255		54	102	101	4
9	1320	20	841.39	.25	.91	157	262		55	103	101	4
10		22.5	842.68	.24	.97	146	260		56	103	101	4
11	1325	25	844.03	.28	.80	155	254		57	104	102	4
12		27.5	845.28	.20	.72	157	256		58	104	102	4
	1330	30	846.449	— Port Change —								
A1	1335		846.449	.34	1.23	154	260		63	105	104	5
2		32.5	848.15	.33	1.20	154	258		56	105	104	5
3	1340	35	849.42	.30	1.09	155	253		55	105	104	5
4		37.5	850.90	.32	1.24	149	255		53	105	104	5
5	1345	40	852.38	.31	1.12	156	258		53	105	104	5
6		42.5	853.83	.30	1.09	156	256		53	105	104	5
7	1350	45	855.24	.28	1.11	147	258		53	105	104	5
8		47.5	856.67	.29	1.05	154	256		53	105	104	5
9	1355	50	858.06	.29	1.10	150	257		53	105	104	5
10		52.5	859.48	.26	1.02	148	258		56	106	104	5
11	1400	55	860.89	.27	.98	154	258		57	106	104	5
12		57.5	862.35	.24	.87	153	257		57	106	105	5
	1405	60	863.591									

COMMENTS

URS	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS AURORA	Project #: 31829746.00001	Date: 2-4-14
Location: #2 CALCINER	Condition:	Run #: 3

Method 4 Moisture Determination

Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	731.4	984.4	
2	DI H_2O	100	GS	742.0	775.2	
3	Empty	--	MOD	681.8	684.2	
4	Silica Gel	--	MOD	986.5	999.8	
Sum						

Recovery Container Weights		Tare (g)	Final (g)	Gain (g)
Filter (no weights)				
PNR & Impinger Catch (DI H_2O Rinse)	CONT 1	62.3	577.1	514.8
	CONT 2	62.2	353.5g	291.3
				806.1

COMMENTS:

URS — FIELD SAMPLING DATA SHEET

EPA Method 13A/B — PAGE 1 OF 1

Client/Plant: PCS	Project #: 318297746.0001	Date: 4/4/14	Operator(s): WL
Location: Cell # 3 stack	Condition:	Run #: 4	Duration (min): 60
DGM#: N-54	CF (Yd): 0.9808	$\Delta H_@$: 1.907	Cp: 0.84
K-Factor:	P_{bar} ("Hg): 29.89	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 15	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 10	Duct Width ("): NA	Duct Length ("): NA
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: 0.278	
Fyrite/Orsat O_2 (%/time) 15.3 % (CEMS)	Fyrite/Orsat CO_2 (%/time) 5.6 % (CEMS)	Nozzle D2 (") ⊘: 0.277		
Fyrite/Orsat O_2 (%/time) % (:)	Fyrite/Orsat CO_2 (%/time) % (:)	Nozzle D3 (") ⊖: 0.276		
Fyrite/Orsat O_2 (%/time) % (:)	Fyrite/Orsat CO_2 (%/time) % (:)	Average Nozzle D ("): 0.276		

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	1455	0	864.319	.37	1.49	146	258		60	106	107	3
2		2.5	866.08	.33	1.22	152	262		58	106	107	3
3	1500	5	867.56	.35	1.27	156	259		54	106	107	4
4		7.5	869.11	.36	1.35	151	254		50	106	107	4
5	1505	10	870.78	.29	1.17	146	254		47	107	109	4
6		12.5	872.31	.32	1.16	155	258		46	108	108	4
7	1510	15	873.66	.29	1.05	155	255		46	108	108	4
8		17.5	875.04	.27	1.10	145	255		46	109	109	5
9	1515	20	876.48	.24	.87	154	250		47	109	109	4
10		22.5	877.79	.27	.98	155	252		47	109	109	5
11	1520	25	879.16	.28	1.16	144	258		46	108	109	5
12		27.5	~~880.68~~	.24	.87	154	257		47	107	109	5
	1525	30	881.932		Port Change							
B1	1532		881.932	.48	1.91	147	257		54	107	108	8
2		~~32.5~~	883.81	.44	1.70	149	251		44	106	108	7
3	1537	35	885.52	.34	1.23	155	253		45	107	107	6
4		~~37.5~~	887.05	.42	1.60	150	255		47	107	107	6
5	1542	40	888.52	.42	1.60	150	254		48	106	107	6
6		~~42.5~~	890.01	.38	1.38	155	257		48	107	107	7
7	1547	45	891.47	.29	1.09	151	258		49	107	107	6
8		~~47.5~~	892.91	.27	1.04	149	257		50	107	107	6
9	1552	50	894.35	.25	.91	155	255		51	107	107	6
10		~~52.5~~	895.64	.26	1.00	149	254		52	107	107	6
11	1557	55	896.98	.22	.86	148	254		52	106	106	5
12		~~57.5~~	898.31	.23	.83	155	254		52	106	106	6
	1602	60	899.571									

COMMENTS

URS	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS AURORA	Project #: 31829746.00001	Date: 4-4-14
Location: #3 CALCINER	Condition:	Run #: 4

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	746.2	983.6	
2	DI H_2O	100	GS	687.2	715.9	
3	Empty	--	MOD	533.6	534.9	
4	Silica Gel	--	MOD	958.8	968.7	
Sum						

Recovery Container Weights		Tare (g)	Final (g)	Gain (g)
Filter (no weights)				
PNR & Impinger Catch (DI H_2O Rinse)	CONT. 1	62.0	597.0	535.0
	CONT 2	62.0	316.9	254.9
				789.9

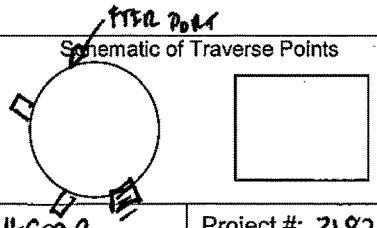
COMMENTS:

URS — FIELD SAMPLING DATA SHEET

EPA METHOD 2

PAGE 1 OF 1

Schematic of Traverse Points



+ Θ: Clockwise Pitot Rotation

- Θ: Counterclockwise Pitot Rotation

Client: POTASH CORP	Project #: 3182974G.00001	Date: 4-3-14	Operator(s): WC/PMT
Plant: AURORA, NC	Location: #3 CALCINER	Condition:	Cp: 0.84
Static P (P_g): -0.24 "H_2O	Barometric P (P_{bar}): 29.95 "Hg	Height w.r.t. Barometer (ft): 100	Pitot Tube #: RTP-8-8

Source Height (ft): 100	Duct Diameter ("): 72	Duct Length ("): NA	Duct Width ("): NA	Area (A): 28.27 ft^2
% O_2:	% CO_2:	O2/CO2 Method:		%H_2O: SATURATED
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓		- P ("H_2O): ✓	

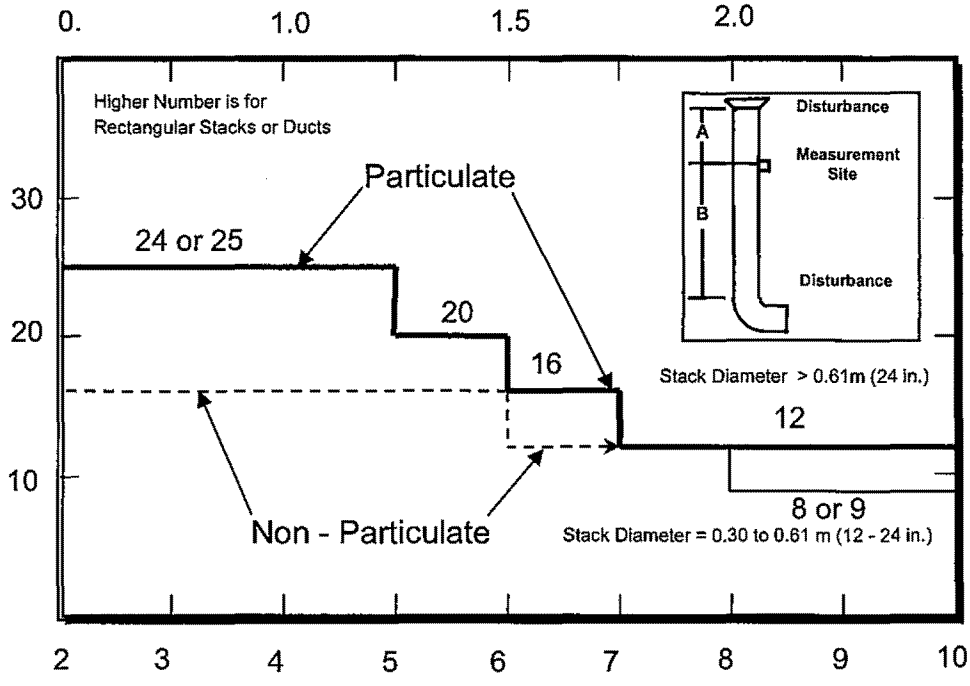
		Run: Preheat				Run:			
Port	Sample Point	Time	ΔP ("H_2O)	T_s (°F)	± Θ + clockwise - counterclockwise	Time	ΔP ("H_2O)	T_s (°F)	± Θ + clockwise - counterclockwise
A 1		1745	0.38	139	20.2				
2			.36	138	19.7				
3			.34	137	18.5				
4			.33	137	5.8				
5			.32	143	12.4				
6			.33	145	14.4				
7			.31	146	12.8				
8			.30	147	5.5				
9			.28	147	4.9				
10			.30	147	7.2				
11			.33	147	10.8				
12			.30	147	11.9				
B 1			0.41	140	15.2				
2			0.50	147	12.2				
3			0.54	148	17.0				
4			0.52	149	16.5				
5			0.53	149	13.4				
6			0.50	148	9.7				
7			0.35	147	2.0				
8			0.32	143	0.5				
9			0.28	142	4.8				
10			0.27	141	7.0				
11			0.28	140	13.2				
12		18:12	0.24	141	18.8				
AVERAGE			0.359	144	11.4	AVERAGE			

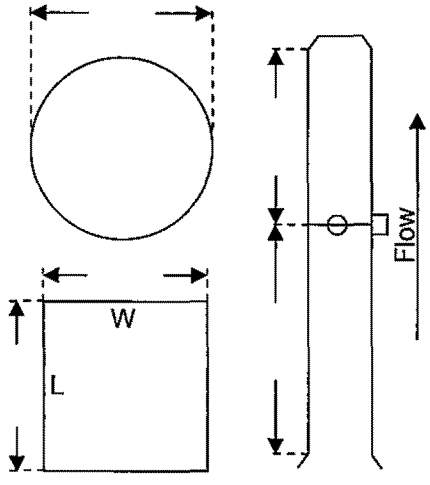
$\bar{T}_s$ = 0.595 144

URS	FIELD SAMPLING DATA SHEET Sample and Velocity Traverse for Stationary Sources	EPA METHOD 1

Client/Plant:	Project #:	Location:	Date:
Number of Traverse Points Chosen:	Number of Ports:	Number of Points per Port:	

Duct Diameters From Downstream Flow Disturbance (Distance A)





Deq = 2LW / (L+W)

Diameters Upstream _____

Diameters Downstream _____

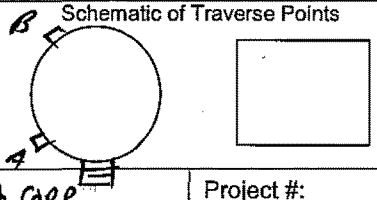
Duct Diameters From Upstream Flow Disturbance (Distance B)

Point on a Diameter	Location of Traverse Points in Circular Stacks* Number of Traverse Points on a Diameter					Traverse Point Location		
	4	6	8	10	12	Distance From Wall	Nipple Length	Total Distance
1	6.7	4.4	3.2	2.6	2.1			
2	25.0	14.6	10.5	8.2	6.7			
3	75.0	29.6	19.4	14.6	11.8			
4	93.3	70.4	32.3	22.6	17.7			
5		85.4	67.7	34.2	25.0			
6		95.6	80.6	65.8	35.6			
7			89.5	77.4	64.4			
8			96.8	85.4	75.0			
9				91.8	82.3			
10				97.4	88.2			
11					93.3			
12					97.9			

* Percent of Stack Diameter from Inside Wall to Traverse Point

Cross-Sectional Layout for Rectangular Stacks	
Traverse Points	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5

URS	FIELD SAMPLING DATA SHEET	EPA METHOD 2
		PAGE _____ OF _____



Schematic of Traverse Points

+ Θ: Clockwise Pitot Rotation 75 1/2

- Θ: Counterclockwise Pitot Rotation 4 1/2

Client: Potash CORP	Project #:	Date: 3/31/14	Operator(s): PAT / WL
Plant: Aurora, NC	Location: #2 CALCINER	Condition: WINDY!!	Cp: 0.84
Static P (P_g): "H_2O	Barometric P (P_{bar}): "Hg	Height w.r.t. Barometer (ft):	Pitot Tube #: PR-8-8

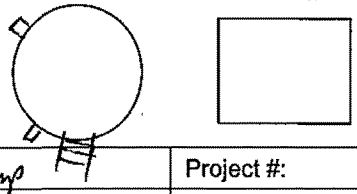
Source Height (ft):	Duct Diameter ("): 72	Duct Length ("):	Duct Width ("):	Area (A): ft^2
% O_2:	% CO_2:	O2/CO2 Method: 3A		%H_2O: SATURATED
Pitot Leak ✓ (>3"H_2O) ✓	+P ("H_2O): ✓		- P ("H_2O): ✓	

		Run:				Run:			
Port	Sample Point	Time	ΔP ("H_2O)	T_s (°F)	± Θ + clockwise - counterclockwise	Time	ΔP ("H_2O)	T_s (°F)	± Θ + clockwise - counterclockwise
A	1	14:35	0.33		3.3				
	2		0.36		2.8				
	3		0.39		2.4				
	4		0.34		2.7				
	5		0.40		3.5				
	6		0.37		3.0				
	7		0.37		6.3				
	8		0.26		1.9				
	9		0.24		3.9				
	10		0.26		4.1				
	11		0.25		5				
	12		0.21		3.4				
B	1		0.29		0.8				
	2		0.35		3.8				
	3		0.38		2.7				
	4		0.34		2.2				
	5		0.29		1.1				
	6		0.30		5.4				
	7		0.30		2.0				
	8		0.32		0.4				
	9		0.26		1.4				
	10		0.25		2.2				
	11		0.23		2.4				
	12	1500	0.24		1.8				
AVERAGE			0.305		2.9	AVERAGE			

Tx 0.550

URS	FIELD SAMPLING DATA SHEET	EPA METHOD 2
		PAGE 1 OF

Schematic of Traverse Points



+ Θ: Clockwise Pitot Rotation

- Θ: Counterclockwise Pitot Rotation

Client: Rotas Corp	Project #:	Date: 4/1/14	Operator(s): PAT/WL
Plant: Aurora, NC	Location: #2 CALCINER	Condition: NORMAL	Cp: 0.84
Static P (P_g): -.1 "H_2O	Barometric P (P_{bar}): 30.04 "Hg	Height w.r.t. Barometer (ft):	Pitot Tube #: RTP-8-8

Source Height (ft): ~100'	Duct Diameter ("): 72	Duct Length ("): NA	Duct Width ("): NA	Area (A): 28.274 ft^2
% O_2:	% CO_2:	O2/CO2 Method: 3A		%H_2O: Saturated
Pitot Leak ✓ (>3"H_2O) ✓		+P ("H_2O): ✓ 4.2		- P ("H_2O): ✓ -4.4

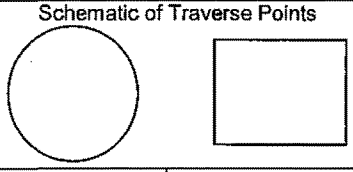
		Run: 1 (15.8 O_2, 5.1 CO_2)				Run: 2 (15.8 O_2, 5.3 CO_2)			
Port	Sample Point	Time	ΔP ("H_2O)	T_s (°F)	± Θ (+ clockwise, - counterclockwise)	Time	ΔP ("H_2O)	T_s (°F)	± Θ (+ clockwise, - counterclockwise)
A X	1	1140	.27	140	8	1108	.24	140	
X	2		.26	142	5		.23	144	
X	3		.23	143	4		.24	144	
X	4		.22	144	3		.22	143	
	5		.23	142	3		.21	142	
	6		.21	140	4		.24	141	
	7		.27	139	5		.24	139	
	8		.23	138	5		.25	138	
	9		.24	136	5		.27	137	
	10		.28	135	4		.26	136	
	11		.26	135	6		.24	136	
	12		.21	132	5		.20	134	
B	1		.31	144	3		.26	132	
	2		.32	143	3		.32	133	
	3		.30	141	5		.28	133	
	4		.32	140	4		.29	133	
	5		.32	140	4		.32	133	
	6		.36	143	2		.24	133	
	7		.20	140	5		.23	133	
	8		.23	133	5		.20	132	
	9		.24	133	4		.20	132	
	10		.22	132	8		.19	132	
	11		.21	132	6		.18	132	
	12	1154	.20	132	5	1114	.21	132	
						$\bar{X}$ =	0.240	136.0	
AVERAGE			0.256	138.3	4.6	AVERAGE			

$\sqrt{\bar{X}}$ = 0.504 BWS = 18.7%

$\sqrt{\bar{X}}$ = 0.489 BWS = 17.6%

URS	FIELD SAMPLING DATA SHEET	EPA METHOD 2
		PAGE 2 OF

Schematic of Traverse Points



+ Θ: Clockwise Pitot Rotation

- Θ: Counterclockwise Pitot Rotation

Client: Potash Corp	Project #:	Date: 4/1/14	Operator(s): MAT / WL
Plant: Aurora, NC	Location: #2 CALCINER	Condition: NORMAL	Cp: 0.84
Static P (P_g): -0.1 "H_2O	Barometric P (P_{bar}): 30.04 "Hg	Height w.r.t. Barometer (ft):	Pitot Tube #: RTP-8-8

Source Height (ft): ~100'	Duct Diameter ("): 72	Duct Length ("): NA	Duct Width ("): NA	Area (A): 28.274 ft^2
% O_2:	% CO_2:	O2/CO2 Method: 3A		%H_2O:
Pitot Leak ✓ (>3"H_2O) ✓		+P ("H_2O): ✓ 5.0		- P ("H_2O): ✓ -4.1

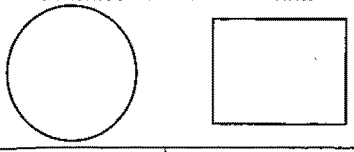
		Run: 3 (15.8 O_2, 5.1 CO_2)				Run: 4 (15.8 O_2, 5.0 CO_2)			
Port	Sample Point	Time	ΔP ("H_2O)	T_s (°F)	± Θ (+ clockwise, - counterclockwise)	Time	ΔP ("H_2O)	T_s (°F)	± Θ (+ clockwise, - counterclockwise)
A	1	228	.29	135		351	.27	142	
	2		.26	135			.25	144	
	3		.27	138			.26	143	
	4		.26	141			.26	142	
	5		.28	143			.27	141	
	6		.22	144			.20	138	
	7		.24	144			.22	138	
	8		.25	143			.24	138	
	9		.27	141			.25	138	
	10		.24	140			.24	137	
	11		.25	139			.23	137	
	12		.21	136			.22	134	
B	1		.28	137			.29	140	
	2		.30	138			.31	142	
	3		.34	139			.33	142	
	4		.32	139			.32	141	
	5		.28	136			.26	140	
	6		.33	139			.31	140	
	7		.24	139			.27	139	
	8		.22	139			.21	138	
	9		.24	138			.24	137	
	10		.25	137			.23	136	
	11		.22	136			.22	136	
	12	235	.20	134		408	.19	134	
						$\bar{X}$ =	0.254	139.0	
AVERAGE			0.261	138.8		AVERAGE			

$\sqrt{\bar{X}}$ = 0.510 BWS = 18.96%

$\sqrt{\bar{X}}$ = 0.502 BWS = 19.1%

URS	FIELD SAMPLING DATA SHEET	EPA METHOD 2
		PAGE 3 OF _____

Schematic of Traverse Points



+ Θ: Clockwise Pitot Rotation

- Θ: Counterclockwise Pitot Rotation

Client: Potash Corp	Project #:	Date: 4/1/14	Operator(s): MT/WL
Plant: Aurora, NC	Location: #2 Calciner	Condition: Normal	Cp: 0.84
Static P (P_g): -0.1 "H_2O	Barometric P (P_{bar}): 30.04 "Hg	Height w.r.t. Barometer (ft): 100'	Pitot Tube #: RTP-8-8

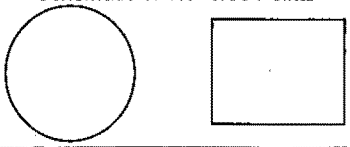
Source Height (ft): ~100'	Duct Diameter ("): 72	Duct Length ("): NA	Duct Width ("): NA	Area (A): 28.274 ft^2
% O_2:	% CO_2:	O2/CO2 Method: 3A		%H_2O: Saturated
Pitot Leak ✓ (>3"H_2O) ✓		+P ("H_2O): ✓		- P ("H_2O): ✓

		Run: 5 (15.8 O_2, 5.0 CO_2)				Run: 6 (30.12 Barometer, 13.8 O_2, 4/2/14, 6.9 CO_2)			
Port	Sample Point	Time	ΔP ("H_2O)	T_s (°F)	± Θ (+ clockwise, - counterclockwise)	Time	ΔP ("H_2O)	T_s (°F)	± Θ (+ clockwise, - counterclockwise)
A	1	512	.26	136		937	.33	145	
	2		.24	137			.30	153	
	3		.22	138			.32	155	
	4		.23	138			.31	154	
	5		.21	138			.29	153	
	6		.23	137			.32	151	
	7		.28	137			.29	146	
	8		.29	137			.32	146	
	9		.27	136			.30	148	
	10		.22	139			.32	151	
	11		.21	137			.32	153	
	12		.19	135			.28	150	
B	1		.31	134			.38	142	
	2		.33	136			.41	146	
	3		.28	137			.42	148	
	4		.32	139			.38	148	
	5		.35	139			.40	147	
	6		.28	140			.40	146	
	7		.25	138			.32	146	
	8		.23	137			.24	145	
	9		.22	137			.34	144	
	10		.22	137			.22	149	
	11		.25	136			.24	151	
	12	520	.20	135		945	.21	152	
						$\bar{x}$ =	0.319	148.7	
AVERAGE			0.254	137.1		$\bar{T}x$ = 0.563 AVERAGE			BWS = 24.3

$\bar{T}x$ = 0.502 BWS = 18.1% (Static -.2) 4/2/14

URS	FIELD SAMPLING DATA SHEET	EPA METHOD 2
		PAGE 4 OF _____

Schematic of Traverse Points



+ Θ: Clockwise Pitot Rotation

- Θ: Counterclockwise Pitot Rotation

Client: Potash Corp	Project #:	Date: 4/2/14	Operator(s): PAT / WL
Plant: Aurora, NC	Location: #2 CALCINER	Condition: NORMAL	Cp: 0.84
Static P (P_g): -0.2 "H_2O	Barometric P (P_{bar}): 30.12 "Hg	Height w.r.t. Barometer (ft): 100	Pitot Tube #: RTP-8-8

Source Height (ft): 100	Duct Diameter ("): 72	Duct Length ("): NA	Duct Width ("): NA	Area (A): ft²
% O_2:	% CO_2:	O2/CO2 Method:		%H_2O: SATURATED
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓		- P ("H_2O): ✓	

		Run: 7	O_2 = 13.6 CO_2 = 7.2			Run: 8			
Port	Sample Point	Time	ΔP ("H_2O)	T_s (°F)	± Θ + clockwise - counterclockwise	Time	ΔP ("H_2O)	T_s (°F)	± Θ + clockwise - counterclockwise
A	1	1247	.28	148					
	2		.32	149					
	3		.27	150					
	4		.26	151					
	5		.28	152					
	6		.29	152					
	7		.30	150					
	8		.31	149					
	9		.33	147					
	10		.29	146					
	11		.30	145					
	12		.24	145					
B	1		.30	141					
	2		.41	143					
	3		.30	143					
	4		.31	144					
	5		.29	144					
	6		.27	143					
	7		.26	143					
	8		.25	143					
	9		.27	143					
	10		.23	143					
	11		.25	142					
	12	1253	.23	142					
AVERAGE			0.285	145.8		AVERAGE			

$\sqrt{\Delta P}$ = 0.533 BWS

URS

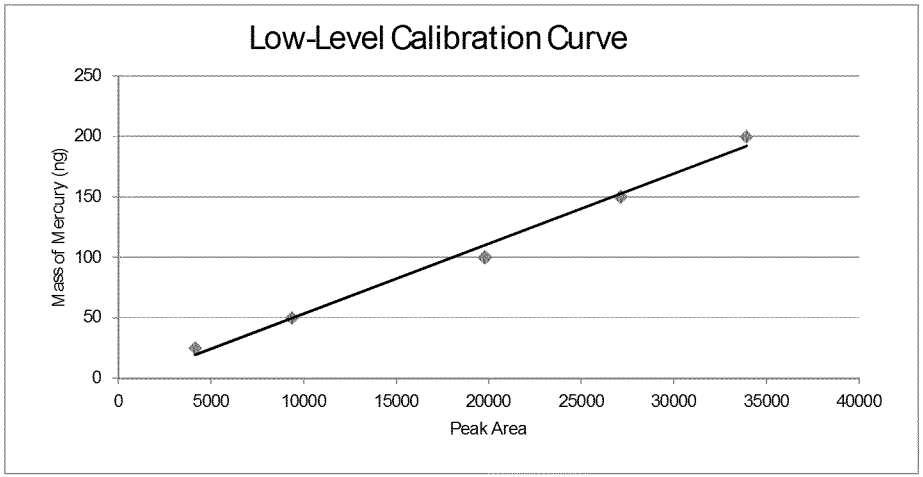
Attachment B
QA/QC Documentation

Project Title	PCS
Location	NC
Project ID	31829746
Date	4/8/2014
Technician	NNL

Ohio Lumex Analysis
Calibration Summary

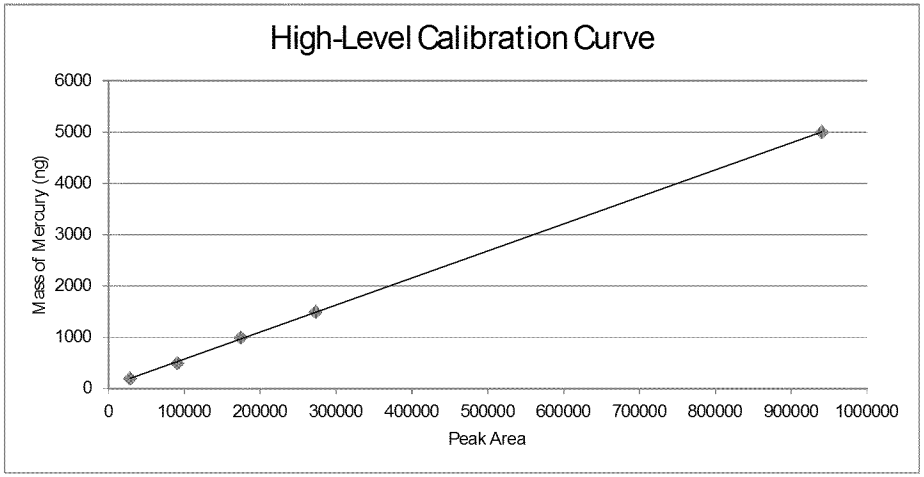
Low-Level Cal Curve	
Slope	0.0058
Intercept	-4.58
r^2	0.9900

Sample Type	Mass (ng)	Peak Area	Cal Curve Mass (ng)	Recovery (%)
Calibration Standards	25	4150	19.53	78
	50	9370	49.85	100
	100	19800	110.44	110
	150	27100	152.84	102
	200	33900	192.34	96
CCV Post-Cal	100	18100	100.56	101
ICV Post-Cal	100	18000	99.98	100
KCl CCV Post-Cal	100	19300	107.53	108
DCS1	10	1720	5.41	
DCS2		2160	7.97	
DCS3		2400	9.36	
Average DCS	10	2093	7.58	



High-Level Cal Curve	
Slope	0.0053
Intercept	53.39
r^2	0.9999

Sample Type	Mass (ng)	Peak Area	Cal Curve Mass (ng)	Recovery (%)
Calibration Standards	200	28300	202.46	101
	500	90700	531.16	106
	1000	174000	969.96	97
	1500	273000	1491.45	99
	5000	940000	5004.96	100
CCV Post-Cal	1000	173000	964.69	96
ICV Post-Cal	1000	166000	927.82	93
KCl CCV Post-Cal	1000	188000	1043.70	104



Ohio Lumex Analysis
MDL Study

Method Detection Limit (MDL)	3.46
Daily DCS Average	2093
Daily 10 ng RF	0.0048

Mass of MDL Standard (ng)	10

Sample Type	Peak Area
MDL Standard Replicates	2170
	2160
	1720
	2020
	2400
	1810
	2110
Average	2056
Standard Deviation (SD)	230.86
3.14 x SD	724.89

MDL Study	
Performed by	Date
NNL	4/8/14

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00106

Sample Run	Description of Conditions
CAL #2 Stack 1	
CAL #2 Stack 2	
CAL #2 Stack 3	Traps extremely moist

Project Title	PCS
Location	NC
Project ID	31829746
Date	4/8/2014
Technician	NNL

Ohio Lumex Analysis
Sample Run Log

Sample Type	CCV Time	Spike Mass (ng)	Sample Run	Trap Side	Sample Trap ID	Sample Fraction	Peak Area	Calculated Mass (ng)	Data Flag	Comments
Speciated			CAL #2 Stack 1	1	OL213525	Plug 1	553	<3.46	U	Test
Speciated			CAL #2 Stack 1	1	OL213525	AGS	101	<3.46	U	
Speciated			CAL #2 Stack 1	1	OL213525	Plug 2 and Bed A	709	<3.46	U	
Speciated			CAL #2 Stack 1	1	OL213525	Plug 3 and Bed B	661	<3.46	U	
Speciated			CAL #2 Stack 1	1	OL213525	Plug 4 and Bed C	307000	1670.55		
Speciated			CAL #2 Stack 1	1	OL213525	Plugs 5&6 and Bed D	1890	9.03	F	
Speciated			CAL #2 Stack 1	2	OL213590	Plug 1	580	<3.46	U	
Speciated			CAL #2 Stack 1	2	OL213590	AGS	230	<3.46	U	
Speciated			CAL #2 Stack 1	2	OL213590	Plug 2 and Bed A	640	<3.46	U	
Speciated			CAL #2 Stack 1	2	OL213590	Plug 3 and Bed B	11	<3.46	U	
Speciated			CAL #2 Stack 1	2	OL213590	Plug 4 and Bed C	274000	1496.72		
Speciated			CAL #2 Stack 1	2	OL213590	Plugs 5&6 and Bed D	528	<3.46	U	
CCV - Post-Sample	17:36	100					18500	102.89		Passed, no need to re-calibrate
CCV - Post-Sample	17:45	1000					182000	1012.10		Passed, no need to re-calibrate
Speciated			CAL #2 Stack 2	1	OL213509	Plug 1	333	<3.46	U	
Speciated			CAL #2 Stack 2	1	OL213509	AGS	-8	<3.46	U	
Speciated			CAL #2 Stack 2	1	OL213509	Plug 2 and Bed A	288	<3.46	U	
Speciated			CAL #2 Stack 2	1	OL213509	Plug 3 and Bed B	73	<3.46	U	
Speciated			CAL #2 Stack 2	1	OL213509	Plug 4 and Bed C	142000	801.39		
Speciated			CAL #2 Stack 2	1	OL213509	Plugs 5&6 and Bed D	968	4.62	F	
Speciated			CAL #2 Stack 2	2	OL213517	Plug 1	721	<3.46	U	
Speciated			CAL #2 Stack 2	2	OL213517	AGS	198	<3.46	U	
Speciated			CAL #2 Stack 2	2	OL213517	Plug 2 and Bed A	583	<3.46	U	
Speciated			CAL #2 Stack 2	2	OL213517	Plug 3 and Bed B	380	<3.46	U	
Speciated			CAL #2 Stack 2	2	OL213517	Plug 4 and Bed C	130000	738.18		
Speciated			CAL #2 Stack 2	2	OL213517	Plugs 5&6 and Bed D	410	<3.46	U	
CCV - Pre-Sample	17:36	100					18200	101.14		Passed, no need to re-calibrate
CCV - Post-Sample	17:45	1000					178000	991.03		Passed, no need to re-calibrate
Speciated			CAL #2 Stack 3	1	OL213506	Plug 1	418	<3.46	U	
Speciated			CAL #2 Stack 3	1	OL213506	AGS	273	<3.46	U	
Speciated			CAL #2 Stack 3	1	OL213506	Plug 2 and Bed A	136	<3.46	U	
Speciated			CAL #2 Stack 3	1	OL213506	Plug 3 and Bed B	252	<3.46	U	
Speciated			CAL #2 Stack 3	1	OL213506	Plug 4 and Bed C	114000	653.90		
Speciated			CAL #2 Stack 3	1	OL213506	Plugs 5&6 and Bed D	-4	<3.46	U	
Speciated			CAL #2 Stack 3	2	OL213606	Plug 1	845	4.04	F	
Speciated			CAL #2 Stack 3	2	OL213606	AGS	141	<3.46	U	
Speciated			CAL #2 Stack 3	2	OL213606	Plug 2 and Bed A	-44	<3.46	U	
Speciated			CAL #2 Stack 3	2	OL213606	Plug 3 and Bed B	160	<3.46	U	
Speciated			CAL #2 Stack 3	2	OL213606	Plug 4 and Bed C	115000	659.17		
Speciated			CAL #2 Stack 3	2	OL213606	Plugs 5&6 and Bed D	444	<3.46	U	
CCV - Post-Sample	19:52	100					19600	109.28		Passed, no need to re-calibrate
CCV - Post-Sample	19:56	1000					197000	1091.11		Passed, no need to re-calibrate
								<3.46	U	
								<3.46	U	
								<3.46	U	
								<3.46	U	
								<3.46	U	
								<3.46	U	
								<3.46	U	
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								<3.46	U	
								<3.46	U	
								<3.46	U	

Project Title	PCS
Location	NC
Project ID	31829746
Date	4/8/2014
Technician	NNL

Ohio Lumex Analysis
CCV and ICV Recoveries

Sample Type	CCV Time	Spike Mass (ng)	Peak Area	Calculated Mass (ng)	Percent Recovery (%)	Comments
Low-Level Calibration						
CCV Post-Cal		100	18100	100.56	101	
ICV Post-Cal		100	18000	99.98	100	
KCl CCV Post-Cal		100	19300	107.53	108	
High-Level Calibration						
CCV Post-Cal		1000	173000	964.69	96	
ICV Post-Cal		1000	166000	927.82	93	
KCl CCV Post-Cal		1000	188000	1043.70	104	
Sample Analysis						
CCV - Post-Sample	17:36	100	18500	102.89	103	Passed, no need to re-calibrate
CCV - Post-Sample	17:45	1000	182000	1012.10	101	Passed, no need to re-calibrate
CCV - Pre-Sample	17:36	100	18200	101.14	101	Passed, no need to re-calibrate
CCV - Post-Sample	17:45	1000	178000	991.03	99	Passed, no need to re-calibrate
CCV - Post-Sample	19:52	100	19600	109.28	109	Passed, no need to re-calibrate
CCV - Post-Sample	19:56	1000	197000	1091.11	109	Passed, no need to re-calibrate

Project Title	PCS
Location	NC
Project ID	31829746
Date	4/8/2014
Technician	NNL

Ohio Lumex Analysis
Speciated Trap Results

Sample Run	Trap Side	Sample Trap ID	Sample Fraction	Peak Area	Calculated Mass (ng)	Data Flag	KCl Breakthrough (%)	Carbon Breakthrough (%)	Particulate Mercury Mass (ng)	Oxidized Mercury Mass (ng)	Elemental Mercury Mass (ng)	Total Mercury Mass (ng)
CAL #2 Stack 1	1	OL213525	Plug 1	553	<3.46	U	100.00	0.54	3.46	10.39	1679.58	1693.43
CAL #2 Stack 1	1	OL213525	AGS	101	<3.46	U						
CAL #2 Stack 1	1	OL213525	Plug 2 and Bed A	709	<3.46	U						
CAL #2 Stack 1	1	OL213525	Plug 3 and Bed B	661	<3.46	U						
CAL #2 Stack 1	1	OL213525	Plug 4 and Bed C	307000	1670.55							
CAL #2 Stack 1	1	OL213525	Plugs 5&6 and Bed D	1890	9.03	F						
CAL #2 Stack 1	2	OL213590	Plug 1	580	<3.46	U	100.00	0.23	3.46	10.39	1500.18	1514.03
CAL #2 Stack 1	2	OL213590	AGS	230	<3.46	U						
CAL #2 Stack 1	2	OL213590	Plug 2 and Bed A	640	<3.46	U						
CAL #2 Stack 1	2	OL213590	Plug 3 and Bed B	11	<3.46	U						
CAL #2 Stack 1	2	OL213590	Plug 4 and Bed C	274000	1496.72							
CAL #2 Stack 1	2	OL213590	Plugs 5&6 and Bed D	528	<3.46	U						
CAL #2 Stack 2	1	OL213509	Plug 1	333	<3.46	U	100.00	0.58	3.46	10.39	806.02	819.87
CAL #2 Stack 2	1	OL213509	AGS	-8	<3.46	U						
CAL #2 Stack 2	1	OL213509	Plug 2 and Bed A	288	<3.46	U						
CAL #2 Stack 2	1	OL213509	Plug 3 and Bed B	73	<3.46	U						
CAL #2 Stack 2	1	OL213509	Plug 4 and Bed C	142000	801.39							
CAL #2 Stack 2	1	OL213509	Plugs 5&6 and Bed D	968	4.62	F						
CAL #2 Stack 2	2	OL213517	Plug 1	721	<3.46	U	100.00	0.47	3.46	10.39	741.64	755.50
CAL #2 Stack 2	2	OL213517	AGS	198	<3.46	U						
CAL #2 Stack 2	2	OL213517	Plug 2 and Bed A	583	<3.46	U						
CAL #2 Stack 2	2	OL213517	Plug 3 and Bed B	380	<3.46	U						
CAL #2 Stack 2	2	OL213517	Plug 4 and Bed C	130000	738.18							
CAL #2 Stack 2	2	OL213517	Plugs 5&6 and Bed D	410	<3.46	U						
CAL #2 Stack 3	1	OL213506	Plug 1	418	<3.46	U	100.00	0.53	3.46	10.39	657.36	671.21
CAL #2 Stack 3	1	OL213506	AGS	273	<3.46	U						
CAL #2 Stack 3	1	OL213506	Plug 2 and Bed A	136	<3.46	U						
CAL #2 Stack 3	1	OL213506	Plug 3 and Bed B	252	<3.46	U						
CAL #2 Stack 3	1	OL213506	Plug 4 and Bed C	114000	653.90							
CAL #2 Stack 3	1	OL213506	Plugs 5&6 and Bed D	-4	<3.46	U						
CAL #2 Stack 3	2	OL213606	Plug 1	845	4.04	F	100.00	0.53	4.04	10.39	662.63	677.06
CAL #2 Stack 3	2	OL213606	AGS	141	<3.46	U						
CAL #2 Stack 3	2	OL213606	Plug 2 and Bed A	-44	<3.46	U						
CAL #2 Stack 3	2	OL213606	Plug 3 and Bed B	160	<3.46	U						
CAL #2 Stack 3	2	OL213606	Plug 4 and Bed C	115000	659.17							
CAL #2 Stack 3	2	OL213606	Plugs 5&6 and Bed D	444	<3.46	U						

17cv1906 Sierra Club v. EPA - 6/22 Production

URS

Dry Gas Meter 5-Point Calibration

Meter Box ID:	N-54	Barometric:	29.96
DGM Number:	12829626	Date:	9-Oct-13
Calibrated By:	ETR		

	Run #1	Run #2	Run #1	Run #2	Run #1	Run #2	Run #1	Run #2	Run #1	Run #2
Orifice ID	11		16		19		23		30	
Orifice Coefficient K'	0.2817		0.4234		0.4923		0.6124		0.7904	
Ambient Temperature	66	68	68	67	68	69	68	68	68	68
Vacuum (>14" Hg)	23	23	21	21	20	20	19	19	17	17
Delta H	0.47	0.47	1.00	1.00	1.40	1.40	2.10	2.10	3.60	3.60
Initial Volume Ft^3	481.900	551.200	494.900	501.300	507.900	514.800	522.100	528.800	535.800	543.200
Final Volume Ft^3	487.900	557.200	500.900	507.300	513.900	520.800	528.100	534.800	541.800	549.200
Total (>5 Ft^3)	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000	6.000
Initial DGM Temp °F	65	72	67	68	68	69	70	71	71	72
Final DGM Temp °F	66	72	68	68	69	70	71	71	72	73
Average Temp °F	65.5	72.0	67.5	68.0	68.5	69.5	70.5	71.0	71.5	72.5
Time Minutes	15	15	10	10	9	9	7	7	5	5
Time Seconds	44.72	42.66	45.82	45.34	14.59	14.00	26.53	25.56	43.59	42.94
Delta H@	1.969	1.952	1.859	1.854	1.925	1.925	1.866	1.864	1.930	1.927
Calibration Factor (γ)	0.9591	0.9670	0.9861	0.9872	0.9855	0.9853	0.9891	0.9878	0.9805	0.9805
Average γ	0.9631		0.9866		0.9854		0.9884		0.9805	
	pass		pass		pass		pass		pass	

Gamma must not deviate by more than +/- 0.02 from average.

Delta H@ must not deviate by more than 0.2 inches of water from average.

Calibration Factor (γ)	0.9808
Delta H@	1.907

PCS Phosphate

4/4/2014

Calciner # 3

Post Test Meter Calibration Check

Meter No. N-54

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (γ_{da})**
1	1.0253
2	1.0220
3	1.0268
4	1.0355
Average	1.0274
Initial Meter γ	0.9808
Deviation	4.8%

Must be less than 5%

URS

Dry Gas Meter Console Calibration

Full Calibration

Date:	27-Jun-13	Technician:	etr	Ref. Pbar:	29.58	"Hg
Box #	2	Cal. Meter:	Wet Test	Meter Pbar:		"Hg
DGM #	**8002547**	Cal. Meter #:	538788	Vacuum	0	" Hg

Flow Rate L/min	Pressure " H2O	Gas Volume Wet Test Meter		Gas Volume Mechanical Meter		Gas Volume Digital Meter		Test Meter Temp. (C) In		Gas Meter Temp (C) In		Time	Yi Mechanical	% Diff Mechanical	Yi Digital	% Diff Digital
2.5		Initial	7671.476	Initial	46027.50	Initial	0.00	22.00		19.44		10				
		Final	7697.400	Final	46053.50	Final	25.79	22.00		20.56			0.9903	-1.09	0.9984	-0.12
		Total	25.924	Total	26.00	Total	25.79	Average	22	Average	20					
1.5		Initial	7699.342	Initial	46055.00	Initial	0.00	22.00		20.56		10				
		Final	7714.544	Final	46070.50	Final	15.15	22.00		21.11			0.9769	-2.43	0.9993	-0.02
		Total	15.202	Total	15.50	Total	15.15	Average	22	Average	21					
0.5		Initial	7715.192	Initial	46071.00	Initial	0.00	22.00		21.11		10				
		Final	7721.424	Final	46077.00	Final	6.21	22.00		21.67			1.0365	3.52	1.0010	0.14
		Total	6.232	Total	6.00	Total	6.21	Average	22	Average	21					
												Average:	1.0013		0.9996	

URS

Dry Gas Meter Console Calibration

Full Calibration

Date:	27-Jun-13	Technician:	etr	Ref. Pbar:	29.57	"Hg
Box #	2	Cal. Meter:	Wet Test	Meter Pbar:		"Hg
DGM #	**8002511**	Cal. Meter #:	538788	Vacuum	0	" Hg

Flow Rate L/min	Pressure " H2O	Gas Volume Wet Test Meter		Gas Volume Mechanical Meter		Gas Volume Digital Meter		Test Meter Temp. (C) In		Gas Meter Temp (C) In		Time	Yi Mechanical	% Diff Mechanical	Yi Digital	% Diff Digital
2.5		Initial	7741.223	Initial	44879.00	Initial	0.00	22.00		22.78		10				
		Final	7766.567	Final	44905.00	Final	25.64	23.00		23.33			0.9766	-2.50	0.9902	0.18
		Total	25.344	Total	26.00	Total	25.64	Average	23	Average	23					
1.5		Initial	7767.050	Initial	44905.50	Initial	0.00	23.00		23.33		10				
		Final	7782.578	Final	44921.50	Final	15.71	23.00		23.89			0.9725	-2.91	0.9907	0.23
		Total	15.528	Total	16.00	Total	15.71	Average	23	Average	24					
0.5		Initial	7782.578	Initial	44921.50	Initial	0.00	23.00		23.89		10				
		Final	7788.894	Final	44927.50	Final	6.44	23.00		23.89			1.0558	5.41	0.9843	-0.41
		Total	6.316	Total	6.00	Total	6.44	Average	23	Average	24					
												Average:	1.0016		0.9884	

Initial System Bias Check

Initial System Bias Check

Plant:	PCS Aurora
Location:	#3 Calciner
Date:	4/4/2014

Reference Gas Cylinders

Parameter	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

System Check	Analyte Units	O2 %	CO2 %
Zero	Ref Cyl Conc.	0	0
	Cal	0.041	0.002
	Average	0.009	0.019
	Bias	0.2	0.1
Span	Ref Cyl Conc.	10.47	9.76
	Cal	10.431	9.69
	Average	10.419	9.708
	Bias	0.1	0.1

Calibration Error Test

Plant: PCS
Location: Aurora
Date: 4/4/2014

Reference Gas Cylinders

Parameter	Zero	Mid Range	High Range
CO2	CC44752	SA18330	CC119741
O2	CC44752	SA18330	CC119741

System Check	Analyte Units	CO2 %	O2 %
Zero	Ref Cyl Conc.	0	0
	Average	0.041	0.002
	Error%	0.2	0
Mid	Ref Cyl Conc.	10.47	9.76
	Average	10.431	9.69
	Error%	0.2	0.3
High	Ref Cyl Conc.	19.21	20.24
	Average	19.361	20.445
	Error%	0.8	1

Final System Bias Check for Run 1 . STRATA Version 3.2

		O2	CO2	O2	CO2
		%	%	Volts	Volts
4/4/2014	10:35:51	14.382	0.436	0.5765	0.0208
4/4/2014	10:36:51	0.059	0.009	0.0024	0.0102
4/4/2014	10:37:51	0.792	0.757	0.0317	0.0287
4/4/2014	10:38:51	10.261	9.588	0.4113	0.2469
4/4/2014	10:39:51	10.388	9.634	0.4164	0.248
4/4/2014	10:40:51	10.393	9.647	0.4166	0.2483

Final System Bias Check for Run 1

Operator:	PAT	
Plant Name:	PCS Aurora	
Location:	#3 Calciner	
	Reference Cylinder Numbers	
	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time		4/4/2014	10:41:01	PASSED
Analyte	O2	CO2		
Units	%	%		
Zero Ref Cyl		0	0	
Zero Cal		0.041	0.002	
Zero Avg		0.037	0.009	
Zero Bias%		0	0	
Zero Drift%		0.1	0	
Span Ref Cyl		10.47	9.76	
Span Cal		10.431	9.69	
Span Avg		10.393	9.647	
Span Bias%		0.2	0.2	
Span Drift%		-0.1	-0.3	
Ini Zero Avg		0.009	0.019	
Ini Span Avg		10.419	9.708	
Run Avg		14.613	6.007	
Co		0.023	0.014	
Cm		10.406	9.678	
Correct Avg		14.712	6.052	

Final System Bias Check for Run 2 . STRATA Version 3.2

		O2 %	CO2 %	O2 Volts	CO2 Volts
4/4/2014	10:55:55	0.048	0.01	0.0019	0.0102
4/4/2014	10:56:55	7.546	7.513	0.3025	0.1956
4/4/2014	10:57:55	10.582	9.642	0.4242	0.2482
4/4/2014	10:58:55	10.906	9.655	0.4372	0.2485
4/4/2014	10:59:55	11.243	9.48	0.4507	0.2442
4/4/2014	11:00:55	10.512	9.704	0.4214	0.2497

Final System Bias Check for Run 2

Operator:	PAT	
Plant Name:	PCS Aurora	
Location:	#3 Calciner	
	Reference Cylinder Numbers	
	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time		4/4/2014	11:01:31	PASSED
Analyte	O2	CO2		
Units	%	%		
Zero Ref Cyl		0	0	
Zero Cal		0.041	0.002	
Zero Avg		0.048	0.01	
Zero Bias%		0	0	
Zero Drift%		0.1	0	
Span Ref Cyl		10.47	9.76	
Span Cal		10.431	9.69	
Span Avg		10.356	9.724	
Span Bias%		0.4	0.2	
Span Drift%		-0.2	0.4	
Ini Zero Avg		0.037	0.009	
Ini Span Avg		10.393	9.647	
Run Avg		14.968	5.636	
Co		0.043	0.009	
Cm		10.374	9.685	
Correct Avg		15.126	5.675	

Final System Bias Check for Run 3 . STRATA Version 3.2

		O2 %	CO2 %	O2 Volts	CO2 Volts
4/4/2014	14:03:33	-0.011	0.067	-0.0005	0.0116
4/4/2014	14:04:33	8.76	8.91	0.3511	0.2301
4/4/2014	14:05:33	10.321	9.664	0.4137	0.2487

Final System Bias Check for Run 3

Operator:	PAT	
Plant Name:	PCS Aurora	
Location:	#3 Calciner	
	Reference Cylinder Numbers	
	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time		4/4/2014	14:05:47	PASSED
Analyte	O2	CO2		
Units	%	%		
Zero Ref Cyl		0	0	
Zero Cal		0.041	0.002	
Zero Avg		-0.009	0.064	
Zero Bias%		0.3	0.3	
Zero Drift%		-0.3	0.3	
Span Ref Cyl		10.47	9.76	
Span Cal		10.431	9.69	
Span Avg		10.324	9.666	
Span Bias%		0.6	0.1	
Span Drift%		-0.2	-0.3	
Ini Zero Avg		0.048	0.01	
Ini Span Avg		10.356	9.724	
Run Avg		13.974	6.475	
Co		0.02	0.037	
Cm		10.34	9.695	
Correct Avg		14.157	6.506	

Final System Bias Check for Run 4 . STRATA Version 3.2

		O2	CO2	O2	CO2
		%	%	Volts	Volts
4/4/2014	15:49:27	7.072	6.68	0.2835	0.175
4/4/2014	15:50:27	10.309	9.624	0.4132	0.2477

Final System Bias Check for Run 4

Operator:	PAT	
Plant Name:	PCS Aurora	
Location:	#3 Calciner	
	Reference Cylinder Numbers	
	Zero	Span
O2	CC44752	SA18330
CO2	CC44752	SA18330

Date/Time		4/4/2014	15:51:16	PASSED
Analyte	O2	CO2		
Units	%	%		
Zero Ref Cyl		0	0	
Zero Cal		0.041	0.002	
Zero Avg		-0.007	0.046	
Zero Bias%		0.2	0.2	
Zero Drift%		0	-0.1	
Span Ref Cyl		10.47	9.76	
Span Cal		10.431	9.69	
Span Avg		10.318	9.633	
Span Bias%		0.6	0.3	
Span Drift%		0	-0.2	
Ini Zero Avg		-0.009	0.064	
Ini Span Avg		10.324	9.666	
Run Avg		15.118	5.561	
Co		-0.008	0.055	
Cm		10.321	9.65	
Correct Avg		15.333	5.6	

Facility: PCS Aurora
Test Site: #3 Calciner
Test Date: 4/4/2014
Component: O2

	Calibration Gases		System Bias Check Results					
Test Run	Zero Gas	Upscale Gas	Initial Zero	Initial Upscale	Final Zero	Final Upscale	Raw Result	Corrected Result (ppm)
1	0	10.47	0.009	10.419	0.037	10.393	14.613	14.712
2	0	10.47	0.037	10.393	0.048	10.356	14.968	15.126
3	0	10.47	0.048	10.356	-0.009	10.324	13.974	14.157
4	0	10.47	-0.009	10.324	-0.007	10.318	15.118	15.333

Facility: PCS Aurora
Test Site: #3 Calciner
Test Date: 4/4/2014
Component: CO2

	Calibration Gases		System Bias Check Results					
Test Run	Zero Gas	Upscale Gas	Initial Zero	Initial Upscale	Final Zero	Final Upscale	Raw Result	Corrected Result (ppm)
1	0	9.76	0.019	9.708	0.009	9.647	6.007	6.052
2	0	9.76	0.009	9.647	0.01	9.724	5.636	5.675
3	0	9.76	0.01	9.724	0.064	9.666	6.475	6.506
4	0	9.76	0.064	9.666	0.046	9.633	5.561	5.6

EPA Method 320 QA/QC Summary

Run #	Avg. HF (ppm)	Avg. HF w/ 0 sub for BDL	Avg. HF w/ DL sub for BDL	EPA Data Designation	SiF4	CO to 7725 ppmm 150C	CO2 to 34%m 150C	CH4 to 39000 ppmm 150C	N2O to 2550 ppmm 150C	NITRIC OXIDE (PF) 150C	NITROGEN DIOXIDE (PF) 150C	H2O to 275 %m 150C hi
Run 1	0.203	0.129	0.181	DLL	< 0.011	126.177	5.328	7.051	16.555	57.162	5.872	30.319
Run 2	0.192	0.055	0.156	DLL	< 0.011	142.071	5.264	6.550	15.684	53.454	6.220	31.327
Run 3	BDL	0.000	0.141	BDL	< 0.011	134.518	5.060	6.330	15.124	59.646	4.995	29.535
Run 4	BDL	0.000	0.141	BDL	< 0.011	131.660	4.988	6.659	14.494	62.991	4.793	28.261
Run 5	BDL	0.000	0.141	BDL	< 0.011	129.624	4.846	6.631	15.753	63.961	5.240	27.487
Run 6	BDL	0.000	0.141	BDL	< 0.011	123.626	4.856	6.843	15.916	63.398	4.495	28.197
HF MDL	0.141				DL=0.011							

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
Pre Test CTS																
PRE-TEST DIRECT_0002.LAB	4/3/2014	11:18:50	0.066	0.010	0.036	9.890	0.005	-0.052	1.047	0.085	0.037	13.202		0.137	149.430	1.013
PRE-TEST DIRECT_0003.LAB	4/3/2014	11:19:19	0.002	0.005	0.031	14.333	0.000	-0.108	-0.005	-0.012	-0.023	17.397		-0.004	149.125	1.013
PRE-TEST DIRECT_0004.LAB	4/3/2014	11:19:49	0.009	0.003	0.041	13.956	0.000	0.039	-0.241	-0.031	-0.034	17.455		-0.006	149.023	1.014
PRE-TEST DIRECT_0005.LAB	4/3/2014	11:20:18	-0.019	-0.001	0.038	14.222	0.000	-0.013	-0.092	-0.001	-0.025	17.382		-0.009	149.125	1.013
PRE-TEST DIRECT_0006.LAB	4/3/2014	11:20:47	0.009	0.002	0.041	14.006	0.000	-0.047	-0.049	-0.010	-0.023	17.319		-0.008	149.125	1.013
PRE-TEST DIRECT_0007.LAB	4/3/2014	11:21:16	-0.003	0.003	0.039	14.020	0.000	0.146	-0.114	-0.006	-0.034	17.128		-0.009	149.227	1.013
PRE-TEST DIRECT_0008.LAB	4/3/2014	11:21:45	-0.011	0.003	0.038	14.128	0.000	-0.096	-0.018	-0.035	-0.020	17.091		-0.008	149.125	1.013
PRE-TEST DIRECT_0009.LAB	4/3/2014	11:22:14	0.002	0.006	0.041	14.001	0.000	-0.114	-0.052	0.018	-0.027	17.199		-0.009	149.430	1.013
PRE-TEST DIRECT_0010.LAB	4/3/2014	11:22:43	0.005	0.003	0.037	14.059	-0.001	-0.022	-0.130	-0.018	-0.017	16.986		-0.006	149.430	1.013
HF Direct																
PRE-TEST DIRECT_0011.LAB	4/3/2014	11:26:43	0.208	8.328	0.042	0.160	0.000	0.176	-1.073	0.019	-0.004			0.053	149.532	1.017
PRE-TEST DIRECT_0012.LAB	4/3/2014	11:27:13	0.194	8.522	0.042	0.057	0.000	-0.048	-1.290	0.000	0.002			0.033	149.430	1.017
PRE-TEST DIRECT_0013.LAB	4/3/2014	11:27:42	0.174	8.520	0.041	-0.015	0.000	0.059	-1.345	0.014	0.006			0.020	149.328	1.018
PRE-TEST DIRECT_0014.LAB	4/3/2014	11:28:11	0.195	8.539	0.043	0.106	0.000	0.228	-1.372	0.010	-0.005			0.018	149.125	1.017
PRE-TEST DIRECT_0015.LAB	4/3/2014	11:28:40	0.235	8.547	0.040	-0.056	0.000	-0.200	-1.407	0.034	-0.005			0.016	149.328	1.017
PRE-TEST DIRECT_0016.LAB	4/3/2014	11:29:09	2.339	7.895	0.036	-0.086	0.000	-0.378	-1.499	0.025	-0.006			0.017	149.328	1.151
PRE-TEST DIRECT_0017.LAB	4/3/2014	11:29:38	15.967	8.732	0.038	-0.032	0.000	-0.136	-1.917	0.060	-0.003			0.002	148.718	1.170
PRE-TEST DIRECT_0018.LAB	4/3/2014	11:30:07	20.288	8.873	0.033	-0.142	0.000	-0.111	-2.105	0.018	0.006			-0.006	148.718	1.175
PRE-TEST DIRECT_0019.LAB	4/3/2014	11:30:36	23.808	9.662	0.040	0.059	0.000	-0.166	-2.297	0.043	0.001			0.000	148.616	1.056
PRE-TEST DIRECT_0020.LAB	4/3/2014	11:31:05	19.487	8.691	0.040	0.192	-0.001	0.136	-1.854	0.022	-0.001			0.003	148.820	1.055
PRE-TEST DIRECT_0021.LAB	4/3/2014	11:31:34	19.519	8.700	0.038	-0.044	0.000	-0.225	-1.924	0.066	0.000			-0.008	149.125	1.055
PRE-TEST DIRECT_0022.LAB	4/3/2014	11:32:03	14.792	8.617	0.079	-0.018	0.000	-0.278	-1.645	0.008	0.001			0.005	148.921	1.017
PRE-TEST DIRECT_0023.LAB	4/3/2014	11:32:32	11.207	8.526	0.087	-0.167	0.000	-0.068	-1.544	0.031	-0.006			-0.005	148.718	1.017
PRE-TEST DIRECT_0024.LAB	4/3/2014	11:33:01	9.544	8.542	0.069	-0.049	0.000	-0.318	-1.528	0.024	-0.012			0.008	149.125	1.017
PRE-TEST DIRECT_0025.LAB	4/3/2014	11:33:30	8.792	8.546	0.062	-0.058	0.000	-0.322	-1.565	-0.006	0.004			-0.002	149.532	1.018
PRE-TEST DIRECT_0026.LAB	4/3/2014	11:33:59	8.422	8.551	0.056	0.003	0.000	-0.217	-1.566	0.033	0.002			-0.004	149.532	1.017
PRE-TEST DIRECT_0027.LAB	4/3/2014	11:34:28	8.193	8.547	0.054	-0.146	0.000	-0.107	-1.586	-0.003	0.002			0.004	149.532	1.018
PRE-TEST DIRECT_0028.LAB	4/3/2014	11:34:57	8.184	8.549	0.054	0.046	0.000	-0.078	-1.571	0.010	-0.005			0.002	149.634	1.018
PRE-TEST DIRECT_0029.LAB	4/3/2014	11:35:26	8.124	8.549	0.052	0.029	0.000	-0.046	-1.576	0.011	0.001			0.006	149.634	1.018
PRE-TEST DIRECT_0030.LAB	4/3/2014	11:35:55	8.146	8.549	0.052	-0.196	0.000	-0.208	-1.604	0.019	0.006			0.000	149.532	1.018
PRE-TEST DIRECT_0031.LAB	4/3/2014	11:36:24	8.200	8.556	0.051	0.026	0.000	-0.315	-1.607	0.023	0.007			0.003	149.532	1.017
PRE-TEST DIRECT_0032.LAB	4/3/2014	11:36:53	8.321	8.549	0.051	-0.052	0.000	-0.157	-1.568	0.025	-0.001			0.004	149.430	1.018
PRE-TEST DIRECT_0033.LAB	4/3/2014	11:37:22	11.775	8.543	0.059	0.014	0.000	-0.249	-1.578	0.039	0.006			0.012	149.532	1.016
PRE-TEST DIRECT_0034.LAB	4/3/2014	11:37:51	15.951	8.516	0.088	0.019	0.000	0.036	-1.519	0.065	0.000			0.036	149.430	1.018
PRE-TEST DIRECT_0035.LAB	4/3/2014	11:38:20	7.627	8.550	0.043	0.000	0.000	-0.221	-1.562	0.022	0.004			0.006	149.430	1.018
PRE-TEST DIRECT_0036.LAB	4/3/2014	11:38:49	7.680	8.550	0.042	0.148	0.000	-0.204	-1.585	0.027	0.006			0.006	149.532	1.017
PRE-TEST DIRECT_0037.LAB	4/3/2014	11:39:18	8.032	8.543	0.045	-0.132	0.000	-0.333	-1.566	0.006	-0.007			0.002	149.532	1.018
PRE-TEST DIRECT_0038.LAB	4/3/2014	11:39:48	8.328	8.534	0.046	-0.163	0.000	-0.172	-1.538	-0.017	-0.009			0.004	149.430	1.018
PRE-TEST DIRECT_0039.LAB	4/3/2014	11:40:17	8.641	8.540	0.047	-0.143	0.000	-0.016	-1.584	-0.029	0.000			0.004	149.532	1.017
PRE-TEST DIRECT_0040.LAB	4/3/2014	11:40:46	8.844	8.534	0.046	0.102	0.000	-0.497	-1.574	0.037	0.000			-0.003	149.532	1.018
PRE-TEST DIRECT_0041.LAB	4/3/2014	11:41:15	9.068	8.540	0.049	-0.009	0.000	-0.403	-1.535	0.026	-0.001			-0.015	149.634	1.017
PRE-TEST DIRECT_0042.LAB	4/3/2014	11:41:44	9.330	8.544	0.050	0.028	-0.001	-0.222	-1.538	0.023	0.000			-0.007	149.634	1.017
PRE-TEST DIRECT_0043.LAB	4/3/2014	11:42:13	9.486	8.535	0.051	-0.179	0.000	-0.587	-1.556	0.078	0.002			-0.006	149.532	1.017
PRE-TEST DIRECT_0045.LAB	4/3/2014	11:43:11	9.832	8.545	0.050	0.158	0.000	-0.181	-1.562	-0.038	-0.003			-0.002	149.532	1.016
PRE-TEST DIRECT_0046.LAB	4/3/2014	11:43:40	9.998	8.546	0.052	-0.053	0.000	-0.507	-1.562	-0.001	0.012			0.008	149.735	1.017
PRE-TEST DIRECT_0047.LAB	4/3/2014	11:44:09	10.204	8.553	0.054	-0.060	0.000	-0.032	-1.568	0.042	-0.004			0.000	149.735	1.018
PRE-TEST DIRECT_0048.LAB	4/3/2014	11:44:38	10.321	8.541	0.052	-0.111	0.000	-0.174	-1.550	0.000	0.005			0.001	149.532	1.018
PRE-TEST DIRECT_0049.LAB	4/3/2014	11:45:07	10.448	8.539	0.053	0.013	-0.001	-0.264	-1.565	0.049	-0.003			0.003	149.430	1.017
PRE-TEST DIRECT_0050.LAB	4/3/2014	11:45:36	10.709	8.553	0.052	-0.178	0.000	0.132	-1.596	0.004	0.003			-0.003	149.735	1.016
PRE-TEST DIRECT_0051.LAB	4/3/2014	11:46:05	10.812	8.552	0.054	0.016	0.000	-0.091	-1.579	-0.007	0.003			-0.006	149.634	1.017
PRE-TEST DIRECT_0052.LAB	4/3/2014	11:46:34	10.922	8.538	0.054	-0.010	-0.001	-0.117	-1.550	0.049	-0.004			0.002	149.634	1.017
PRE-TEST DIRECT_0053.LAB	4/3/2014	11:47:03	11.072	8.550	0.053	-0.028	0.000	0.144	-1.584	0.029	-0.002			0.002	149.634	1.017
PRE-TEST DIRECT_0054.LAB	4/3/2014	11:47:32	11.159	8.538	0.055	0.085	0.000	-0.241	-1.565	0.008	-0.009			0.004	149.634	1.018
PRE-TEST DIRECT_0055.LAB	4/3/2014	11:48:01	11.351	8.547	0.057	0.171	0.000	0.050	-1.572	0.004	-0.007			0.000	149.634	1.017
PRE-TEST DIRECT_0056.LAB	4/3/2014	11:48:30	11.462	8.542	0.056	-0.121	0.000	-0.021	-1.546	0.029	-0.005			0.000	149.532	1.017
PRE-TEST DIRECT_0057.LAB	4/3/2014	11:48:59	11.626	8.545	0.058	0.111	0.000	-0.327	-1.557	0.032	0.002			0.000	149.532	1.016
PRE-TEST DIRECT_0058.LAB	4/3/2014	11:49:28	11.809	8.537	0.058	-0.004	0.000	-0.062	-1.572	-0.015	-0.002			0.003	149.430	1.017
PRE-TEST DIRECT_0059.LAB	4/3/2014	11:49:57	11.878	8.543	0.059	-0.121	0.000	-0.218	-1.561	0.035	-0.004			0.000	149.430	1.016
PRE-TEST DIRECT_0060.LAB	4/3/2014	11:50:26	11.945	8.538	0.058	0.141	0.000	-0.007	-1.532	0.024	0.005			0.004	149.430	1.016
PRE-TEST DIRECT_0061.LAB	4/3/2014	11:50:55	12.065	8.545	0.061	0.047	0.000	-0.010	-1.578	-0.006	-0.002			0.007	149.430	1.017
PRE-TEST DIRECT_0062.LAB	4/3/2014	11:51:24	12.277	8.545	0.061	-0.110	-0.001	-0.135	-1.607	0.008	-0.010			-0.002	149.430	1.017
PRE-TEST DIRECT_0063.LAB	4/3/2014	11:51:53	12.385	8.564	0.062	-0.165	0.000	-0.002	-1.580	0.007	-0.002			0.001	149.634	1.016
PRE-TEST DIRECT_0064.LAB	4/3/2014	11:52:22	12.473	8.565	0.062	0.056	0.000	-0.101	-1.593	0.035	-0.005			-0.001	149.735	1.017
PRE-TEST DIRECT_0065.LAB	4/3/2014	11:52:52	12.612	8.558	0.063	0.000	0.000	0.080	-1.572	0.048	0.000			0.006	149.532	1.017
PRE-TEST DIRECT_0066.LAB	4/3/2014	11:53:21	12.652	8.554	0.063	-0.214	0.000	-0.087	-1.582	0.008	-0.007			-0.001	149.634	1.017
PRE-TEST DIRECT_0067.LAB	4/3/2014	11:53:50	12.805	8.564	0.064	-0.061	0.000	-0.057	-1.605	0.023	0.000			0.000	149.532	1.017
PRE-TEST DIRECT_0068.LAB	4/3/2014	11:54:19	12.790	8.564	0.067	-0.070	0.000	-0.278	-1.585	0.001	-0.008			0.002	149.532	1.017
PRE-TEST DIRECT_0069.LAB	4/3/2014	11:54:48	12.920	8.570	0.065	0.007	0.000	-0.474	-1.584	-0.021	-0.001			-0.002	149.532	1.016
PRE-TEST DIRECT_0070.LAB	4/3/2014	11:55:17	13.019	8.558	0.067	-0.064	0.000	0.161	-1.585	0.040	-0.005			0.002	149.735	1.017
PRE-TEST DIRECT_0071.LAB	4/3/2014	11:55:46	13.090	8.558	0.068	-0.146	0.000	-0.031	-1.593	-0.007	0.006			0.009	149.634	1.017
PRE-TEST DIRECT_0072.LAB	4/3/2014	11:56:15	13.205	8.554	0.070	-0.006	0.000	0.287	-1.592	0.037	0.002			0.006	149.634	1.017
PRE-TEST DIRECT_0073.LAB	4/3/2014	11:56:44	13.301	8.553	0.070	-0.250	0.000	0.065	-1.605	0.014	-0.004			0.000	149.532	1.017
PRE-TEST DIRECT_0074.LAB	4/3/2014	11:57:13	13.449	8.565	0.072	-0.092	0.000	-0.113	-1.581	-0.011	-0.001			-0.008	149.532	1.017
PRE-TEST DIRECT_0075.LAB	4/3/2014	11:57:42	13.637	8.558	0.073	0.011	0.000	0.117	-1.601	-0.011	-0.001			0.007	149.532	1.017
PRE-TEST DIRECT_0076.LAB	4/3/2014	11:58:11	13.681	8.567	0.073	-0.050	0.000	-0.198	-1.611	0.016	0.004			-0.003	149.634	1.017
PRE-TEST DIRECT_0077.LAB	4/3/2014	11:58:40	13.738	8.563	0.073	-0.084	0.000	-0.055	-1.579	0.007	-0.004			0.004	149.634	1.017
PRE-TEST DIRECT_0078.LAB	4/3/2014	11:59:09	13.788	8.562	0.073	0.084	0.000	-0.124	-1.594	0.046	-0.004			-0.001	149.532	1.017
PRE-TEST DIRECT_0079.LAB	4/3/2014	11:59:38	13.876	8.572	0.075	-0.060	0.000	-0.019	-1.626	-0.041	-0.004			0.002	149.735	1.016
PRE-TEST DIRECT_0080.LAB	4/3/2014	12:00:07	13.981	8.558	0.074	-0.110	0.000	0.130	-1.622	0.028	0.000			0.004	149.532	1.017
PRE-TEST DIRECT_0081.LAB	4/3/2014	12:00:36	14.056	8.546	0.075	0.106	0.000	-0.071	-1.576	0.026	-0.008			-0.002	149.532	1.017
PRE-TEST DIRECT_0082.LAB	4/3/2014	12:01:05	14.228	8.556	0.075	-0.016	0.000	-0.068	-1.610	0.014	0.000			0.002	149.532	1.016
PRE-TEST DIRECT_0083.LAB	4/3/2014	12:01:34	14.267	8.553	0.076	0.041	0.000	-0.115	-1.593	0.007	-0.007			-0.003	149.634	1.017
PRE-TEST DIRECT_0084.LAB	4/3/2014	12:02:03	14.368	8.564	0.076	-0.163	0.000	-0.080	-1.600	0.027	-0.002			-0.001	149.532	1.016
PRE-TEST DIRECT_0085.LAB	4/3/2014	12:02:32	14.432	8.555	0.077	-0.118	0.000	-0.140	-1.595	-0.003	0.003			0.004	149.532	1.016
PRE-TEST DIRECT_0086.LAB	4/3/2014	12:03:01	14.486	8.547	0.076	-0.167	0.000	-0.528	-1.573	0.023	0.004			-0.004	149.532	1.017
PRE-TEST DIRECT_0087.LAB	4/3/2014	12:03:30	14.599	8.552	0.076	-0.077	0.000	-0.596	-1.579	0.038	0.008			0.004	149.430	1.016
PRE-TEST DIRECT_0088.LAB	4/3/2014	12:03:59	14.683	8.563	0.078	-0.047	0.000	0.006	-1.596	-0.010	-0.003			0.001	149.532	1.016
PRE-TEST DIRECT_0089.LAB	4/3/2014	12:04:28	14.717	8.555	0.076	-0.160	-0.001	0.007	-1.602	0.027	-0.006			0.003	149.532	1.017
PRE-TEST DIRECT_0090.LAB	4/3/2014	12:04:57	14.744	8.564	0.078	-0.075	0.000	-0.233	-1.635	-0.016	-0.001			0.003	149.634	1.017
PRE-TEST DIRECT_0091.LAB	4/3/2014	12:05:26	14.754	8.565	0.078	0.057	0.000	-0.172	-1.604	0.040	-0.006			-0.002	149.532	1.017
PRE-TEST DIRECT_0092.LAB	4/3/2014	12:05:56	14.916	8.571	0.079	0.035	0.000	-0.101	-1.625	0.009	-0.007			-0.002	149.532	1.017
PRE-TEST DIRECT_0093.LAB	4/3/2014	12:06:26	15.081	8.576	0.080	0.036	0.000	-0.113	-1.630	-0.010	0.000			-0.011	149.532	1.016
PRE-TEST DIRECT_0094.LAB	4/3/2014	12:06:54	15.139	8.566	0.081	0.070	0.000	-0.026	-1.598	-0.004	-0.006			0.004	149.634	1.017
PRE-TEST DIRECT_0095.LAB	4/3/2014	12:07:23	15.137	8.569	0.081	-0.074	0.000	-0.331	-1.606	0.023	0.004			-0.004	149.532	1.016
PRE-TEST DIRECT_0096.LAB	4/3/2014	12:07:52	15.133	8.569	0.079	-0.172	0.000	-0.354	-1.621	-0.029	0.006			-0.005	149.532	1.017
PRE-TEST DIRECT_0097.LAB	4/3/2014	12:08:21	15.208	8.571	0.082	0.123	0.000	0.039	-1.629	-0.010	-0.002			-0.006	149.634	1.017
PRE-TEST DIRECT_0098.LAB	4/3/2014	12:08:50	15.381	8.570	0.080	-0.025	0.000	-0.025	-1.611	-0.012	0.000			0.003	149.532	1.016
PRE-TEST DIRECT_0099.LAB	4/3/2014	12:09:19	15.436	8.575	0.083	-0.341	0.000	-0.151	-1.628	0.029	0.000			-0.004	149.430	1.016
PRE-TEST DIRECT_0100.LAB	4/3/2014	12:09:48	15.483	8.571	0.082	-0.007	0.000	-0.038	-1.626	-0.014	-0.007			-0.005	149.532	1.016
PRE-TEST DIRECT_0101.LAB	4/3/2014	12:10:17	15.551	8.572	0.083	0.029	0.000	-0.179	-1.609	0.002	-0.005			-0.005	149.634	1.017
PRE-TEST DIRECT_0102.LAB	4/3/2014	12:10:46	15.615	8.572	0.083	-0.001	0.000	-0.231	-1.633	0.009	0.003			-0.001	149.532	1.017
PRE-TEST DIRECT_0103.LAB	4/3/2014	12:11:15	15.754	8.576	0.081	-0.060	0.000	-0.108	-1.615	-0.031	-0.010			-0.003	149.532	1.017
PRE-TEST DIRECT_0104.LAB	4/3/2014	12:11:44	15.815	8.574	0.082	-0.084	0.000	-0.302	-1.631	-0.035	0.006			-0.003	149.532	1.016
PRE-TEST DIRECT_0105.LAB	4/3/2014	12:12:13	15.812	8.566	0.084	-0.143	0.000	0.006	-1.627	0.021	-0.003			0.006	149.532	1.017
PRE-TEST DIRECT_0106.LAB	4/3/2014	12:12:42	15.960	8.578	0.084	0.176	0.000	-0.505	-1.618	-0.014	0.002			-0.012	149.634	1.016
PRE-TEST DIRECT_0107.LAB	4/3/2014	12:13:11	15.883	8.573	0.083	0.055	0.001	-0.486	-1.603	-0.027	0.004			-0.012	149.735	1.017
PRE-TEST DIRECT_0108.LAB	4/3/2014	12:13:40	16.063	8.583	0.085	0.144	0.000	-0.347	-1.622	-0.040	0.000			-0.008	149.532	1.016
PRE-TEST DIRECT_0109.LAB	4/3/2014	12:14:09	16.238	8.582	0.086	-0.112	0.000	-0.369	-1.643	0.023	-0.010			-0.014	149.532	1.016
PRE-TEST DIRECT_0110.LAB	4/3/2014	12:14:38	16.244	8.568	0.086	-0.197	0.000	-0.110	-1.630	-0.031	-0.002			-0.015	149.430	1.017
PRE-TEST DIRECT_0111.LAB	4/3/2014	12:15:07	16.301	8.581	0.088	-0.157	0.000	-0.170	-1.640	-0.010	-0.001			-0.005	149.634	1.016
PRE-TEST DIRECT_0112.LAB	4/3/2014	12:15:36	16.299	8.579	0.090	-0.201	0.000	-0.503	-1.647	-0.001	-0.008			-0.006	149.532	1.016
PRE-TEST DIRECT_0113.LAB	4/3/2014	12:16:05	16.429	8.578	0.090	-0.118	0.000	-0.258	-1.614	-0.020	-0.007			-0.005	149.634	1.016
PRE-TEST DIRECT_0114.LAB	4/3/2014	12:16:34	16.526	8.584	0.090	-0.103	0.000	-0.272	-1.618	-0.021	-0.001			-0.006	149.532	1.016
PRE-TEST DIRECT_0115.LAB	4/3/2014	12:17:03	16.477	8.577	0.090	0.157	0.000	-0.105	-1.631	0.009	-0.001			-0.006	149.532	1.016
PRE-TEST DIRECT_0116.LAB	4/3/2014	12:17:32	16.466	8.578	0.089	-0.056	0.000	-0.186	-1.605	0.013	-0.001			-0.003	149.532	1.016
PRE-TEST DIRECT_0117.LAB	4/3/2014	12:18:01	16.504	8.577	0.088	-0.060	0.000	-0.374	-1.607	-0.032	-0.003			-0.006	149.532	1.017
PRE-TEST DIRECT_0118.LAB	4/3/2014	12:18:30	16.456	8.569	0.088	-0.215	0.000	-0.369	-1.620	0.005	0.006			0.000	149.532	1.017
PRE-TEST DIRECT_0119.LAB	4/3/2014	12:18:59	16.536	8.579	0.088	0.057	0.000	-0.403	-1.596	-0.055	0.002			-0.015	149.634	1.016
PRE-TEST DIRECT_0120.LAB	4/3/2014	12:19:29	16.484	8.569	0.089	-0.074	0.000	-0.393	-1.591	0.019	0.004			-0.004	149.735	1.016
PRE-TEST DIRECT_0121.LAB	4/3/2014	12:19:58	16.594	8.566	0.089	-0.167	0.000	-0.638	-1.586	0.011	0.005			-0.011	149.634	1.017
PRE-TEST DIRECT_0122.LAB	4/3/2014	12:20:27	16.665	8.568	0.091	-0.110	0.000	-0.469	-1.573	0.007	-0.002			-0.011	149.634	1.016
PRE-TEST DIRECT_0123.LAB	4/3/2014	12:20:56	16.694	8.563	0.090	-0.135	0.000	-0.243	-1.584	0.001	-0.003			0.003	149.430	1.016

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
PRE-TEST DIRECT_0124.LAB	4/3/2014	12:21:25	16.679	8.567	0.090	-0.182	0.000	-0.467	-1.592	-0.045	-0.002			-0.007	149.532	1.016
PRE-TEST DIRECT_0125.LAB	4/3/2014	12:21:54	16.824	8.565	0.090	-0.364	0.000	-0.232	-1.583	-0.009	-0.006			-0.012	149.532	1.016
PRE-TEST DIRECT_0126.LAB	4/3/2014	12:22:23	16.922	8.565	0.090	-0.066	0.001	-0.530	-1.594	-0.013	0.001			-0.007	149.430	1.016
PRE-TEST DIRECT_0127.LAB	4/3/2014	12:22:52	16.900	8.560	0.091	-0.135	0.000	-0.161	-1.607	0.051	0.000			-0.009	149.430	1.017
PRE-TEST DIRECT_0128.LAB	4/3/2014	12:23:21	17.043	8.566	0.091	-0.073	0.000	-0.065	-1.600	0.018	0.004			-0.001	149.532	1.016
PRE-TEST DIRECT_0129.LAB	4/3/2014	12:23:50	17.129	8.576	0.091	-0.046	0.000	-0.202	-1.584	0.009	0.005			-0.009	149.634	1.016
PRE-TEST DIRECT_0130.LAB	4/3/2014	12:24:19	17.161	8.565	0.092	0.055	0.000	-0.234	-1.599	0.020	-0.001			-0.007	149.532	1.016
PRE-TEST DIRECT_0131.LAB	4/3/2014	12:24:48	17.184	8.568	0.090	0.067	0.000	-0.343	-1.584	0.003	0.008			-0.018	149.532	1.016
PRE-TEST DIRECT_0132.LAB	4/3/2014	12:25:17	17.225	8.569	0.089	-0.416	0.000	-0.257	-1.591	-0.010	0.000			-0.012	149.532	1.016
PRE-TEST DIRECT_0133.LAB	4/3/2014	12:25:46	17.390	8.567	0.090	0.007	0.000	-0.082	-1.606	0.032	0.003			-0.012	149.532	1.016
PRE-TEST DIRECT_0134.LAB	4/3/2014	12:26:15	17.363	8.569	0.090	-0.196	0.000	-0.289	-1.597	-0.058	-0.006			-0.003	149.634	1.016
PRE-TEST DIRECT_0135.LAB	4/3/2014	12:26:44	17.232	8.564	0.089	-0.253	0.000	-0.288	-1.611	-0.010	0.006			-0.011	149.634	1.017
PRE-TEST DIRECT_0136.LAB	4/3/2014	12:27:13	17.247	8.565	0.089	-0.104	0.000	-0.292	-1.594	-0.004	-0.004			-0.004	149.532	1.016
PRE-TEST DIRECT_0137.LAB	4/3/2014	12:27:42	17.326	8.561	0.091	-0.384	0.000	-0.279	-1.612	-0.005	-0.004			-0.013	149.532	1.017
PRE-TEST DIRECT_0138.LAB	4/3/2014	12:28:11	17.427	8.567	0.087	0.006	0.000	-0.312	-1.612	-0.008	-0.009			-0.005	149.430	1.016
PRE-TEST DIRECT_0139.LAB	4/3/2014	12:28:40	17.445	8.564	0.089	-0.249	0.000	-0.352	-1.614	0.002	0.006			-0.009	149.430	1.016
PRE-TEST DIRECT_0140.LAB	4/3/2014	12:29:09	17.554	8.563	0.090	-0.190	0.000	-0.352	-1.649	-0.015	-0.005			-0.008	149.430	1.016
PRE-TEST DIRECT_0141.LAB	4/3/2014	12:29:38	17.700	8.566	0.089	-0.158	0.000	-0.269	-1.626	-0.030	-0.005			-0.022	149.532	1.016
PRE-TEST DIRECT_0142.LAB	4/3/2014	12:30:07	17.701	8.561	0.088	0.009	0.000	-0.378	-1.606	-0.007	0.007			-0.012	149.532	1.017
PRE-TEST DIRECT_0143.LAB	4/3/2014	12:30:36	17.739	8.572	0.089	-0.087	0.000	-0.363	-1.620	-0.013	0.000			-0.008	149.532	1.015
PRE-TEST DIRECT_0144.LAB	4/3/2014	12:31:05	17.667	8.563	0.087	-0.220	0.000	-0.441	-1.622	-0.024	0.015			-0.006	149.430	1.016
PRE-TEST DIRECT_0145.LAB	4/3/2014	12:31:34	17.830	8.574	0.088	-0.076	0.000	-0.471	-1.594	-0.039	-0.012			-0.012	149.532	1.016
PRE-TEST DIRECT_0146.LAB	4/3/2014	12:32:04	17.997	8.572	0.088	-0.211	0.000	-0.336	-1.644	0.006	-0.002			-0.015	149.532	1.016
PRE-TEST DIRECT_0147.LAB	4/3/2014	12:32:33	17.967	8.568	0.087	-0.067	0.000	-0.460	-1.627	0.038	-0.003			-0.008	149.532	1.016
PRE-TEST DIRECT_0148.LAB	4/3/2014	12:33:02	18.076	8.576	0.086	-0.165	0.000	-0.457	-1.609	0.010	-0.007			-0.010	149.532	1.015
PRE-TEST DIRECT_0149.LAB	4/3/2014	12:33:31	18.040	8.567	0.086	-0.318	0.000	-0.300	-1.606	-0.049	0.001			-0.010	149.532	1.016
PRE-TEST DIRECT_0150.LAB	4/3/2014	12:34:00	18.117	8.569	0.087	-0.100	0.001	-0.290	-1.607	0.014	-0.002			-0.005	149.430	1.015
PRE-TEST DIRECT_0151.LAB	4/3/2014	12:34:29	18.136	8.571	0.086	-0.194	0.000	-0.286	-1.633	-0.001	-0.001			-0.003	149.532	1.016
PRE-TEST DIRECT_0152.LAB	4/3/2014	12:34:58	18.223	8.576	0.085	-0.100	0.000	-0.207	-1.643	-0.015	-0.010			-0.006	149.532	1.015
PRE-TEST DIRECT_0153.LAB	4/3/2014	12:35:27	18.308	8.570	0.085	0.018	0.000	-0.432	-1.625	0.001	-0.003			-0.010	149.735	1.016
PRE-TEST DIRECT_0154.LAB	4/3/2014	12:35:56	18.375	8.572	0.086	-0.049	0.000	-0.512	-1.612	-0.008	-0.001			-0.007	149.532	1.016
PRE-TEST DIRECT_0155.LAB	4/3/2014	12:36:25	18.409	8.562	0.087	-0.184	0.000	-0.295	-1.597	-0.006	0.000			-0.009	149.430	1.016
PRE-TEST DIRECT_0156.LAB	4/3/2014	12:36:54	18.386	8.575	0.082	-0.217	0.000	-0.470	-1.614	-0.019	-0.016			-0.005	149.735	1.016
PRE-TEST DIRECT_0157.LAB	4/3/2014	12:37:23	18.428	8.568	0.084	-0.377	0.000	-0.371	-1.632	-0.012	-0.008			-0.008	149.532	1.016
PRE-TEST DIRECT_0158.LAB	4/3/2014	12:37:52	18.473	8.574	0.084	-0.115	0.000	-0.248	-1.611	-0.022	0.006			-0.005	149.532	1.015
PRE-TEST DIRECT_0159.LAB	4/3/2014	12:38:21	18.566	8.571	0.084	-0.225	0.000	-0.359	-1.629	-0.019	0.004			-0.008	149.532	1.016
PRE-TEST DIRECT_0160.LAB	4/3/2014	12:38:50	18.670	8.569	0.082	-0.236	0.000	-0.240	-1.622	-0.003	-0.006			-0.016	149.532	1.016
PRE-TEST DIRECT_0161.LAB	4/3/2014	12:39:19	18.676	8.572	0.083	0.089	0.000	-0.135	-1.639	-0.023	-0.015			-0.007	149.532	1.016
PRE-TEST DIRECT_0162.LAB	4/3/2014	12:39:48	18.770	8.570	0.084	-0.160	0.000	-0.548	-1.648	0.024	-0.003			-0.006	149.532	1.016
PRE-TEST DIRECT_0163.LAB	4/3/2014	12:40:17	18.784	8.570	0.082	-0.137	0.000	-0.396	-1.638	-0.010	-0.006			-0.009	149.532	1.016
PRE-TEST DIRECT_0164.LAB	4/3/2014	12:40:46	18.790	8.567	0.082	-0.149	0.000	-0.220	-1.626	0.013	-0.004			-0.009	149.430	1.016
PRE-TEST DIRECT_0165.LAB	4/3/2014	12:41:15	18.750	8.567	0.081	-0.191	0.000	-0.312	-1.623	-0.008	-0.006			-0.010	149.532	1.016
PRE-TEST DIRECT_0166.LAB	4/3/2014	12:41:44	18.728	8.579	0.081	-0.101	0.000	-0.301	-1.617	-0.047	0.002			-0.009	149.634	1.015
PRE-TEST DIRECT_0167.LAB	4/3/2014	12:42:13	18.731	8.580	0.079	-0.336	0.000	-0.272	-1.639	-0.022	-0.003			-0.005	149.735	1.016
PRE-TEST DIRECT_0168.LAB	4/3/2014	12:42:42	18.796	8.574	0.079	-0.116	0.000	-0.272	-1.634	-0.020	-0.009			-0.001	149.634	1.016
PRE-TEST DIRECT_0183.LAB	4/3/2014	12:49:58	19.420	8.578	0.074	-0.088	0.000	-0.405	-1.627	-0.019	0.004			-0.014	149.532	1.016
PRE-TEST DIRECT_0184.LAB	4/3/2014	12:50:27	19.425	8.584	0.072	-0.042	0.000	-0.537	-1.631	-0.010	0.002			-0.009	149.532	1.015
PRE-TEST DIRECT_0203.LAB	4/3/2014	13:01:56	10.004	8.585	0.223	-0.132	0.000	-0.245	-1.554	0.027	-0.002			0.032	149.328	1.016
PRE-TEST DIRECT_0204.LAB	4/3/2014	13:02:25	10.418	8.583	0.247	-0.197	0.000	-0.050	-1.554	-0.009	-0.009			0.030	149.328	1.016
PRE-TEST DIRECT_0205.LAB	4/3/2014	13:02:54	10.793	8.583	0.269	-0.371	0.001	-0.476	-1.528	0.000	0.001			0.021	149.328	1.016
PRE-TEST DIRECT_0206.LAB	4/3/2014	13:03:23	11.139	8.580	0.289	0.036	0.000	-0.229	-1.532	0.031	-0.002			0.026	149.532	1.016
PRE-TEST DIRECT_0207.LAB	4/3/2014	13:03:52	11.436	8.580	0.312	-0.183	0.000	-0.198	-1.534	0.039	-0.009			0.029	149.532	1.016
PRE-TEST DIRECT_0208.LAB	4/3/2014	13:04:21	11.702	8.586	0.331	-0.194	0.000	0.025	-1.536	0.005	-0.002			0.025	149.430	1.016
PRE-TEST DIRECT_0209.LAB	4/3/2014	13:04:50	11.920	8.584	0.346	-0.131	0.000	-0.301	-1.535	0.004	-0.009			0.023	149.227	1.016
PRE-TEST DIRECT_0210.LAB	4/3/2014	13:05:19	12.091	8.577	0.364	-0.041	0.000	-0.427	-1.552	0.017	-0.013			0.015	149.328	1.017
PRE-TEST DIRECT_0211.LAB	4/3/2014	13:05:48	12.331	8.588	0.379	0.021	0.000	-0.356	-1.548	0.001	-0.014			0.016	149.532	1.016
PRE-TEST DIRECT_0212.LAB	4/3/2014	13:06:17	12.466	8.584	0.391	-0.275	0.001	-0.341	-1.546	-0.031	0.000			0.017	149.532	1.016
PRE-TEST DIRECT_0213.LAB	4/3/2014	13:06:46	12.494	8.584	0.402	-0.119	0.000	-0.480	-1.542	0.027	0.001			0.017	149.430	1.016
PRE-TEST DIRECT_0214.LAB	4/3/2014	13:07:15	12.677	8.587	0.414	-0.234	0.001	-0.195	-1.553	0.008	-0.010			0.021	149.532	1.016
PRE-TEST DIRECT_0215.LAB	4/3/2014	13:07:44	12.822	8.580	0.427	-0.118	0.000	-0.352	-1.538	0.009	-0.011			0.021	149.125	1.016
PRE-TEST DIRECT_0216.LAB	4/3/2014	13:08:13	12.984	8.580	0.441	0.099	0.000	-0.248	-1.549	0.035	-0.007			0.015	149.430	1.016
PRE-TEST DIRECT_0217.LAB	4/3/2014	13:08:42	13.152	8.579	0.455	-0.270	0.000	-0.289	-1.562	0.031	0.001			0.016	149.328	1.016
PRE-TEST DIRECT_0218.LAB	4/3/2014	13:09:11	13.235	8.575	0.465	0.036	0.000	-0.402	-1.535	-0.009	0.001			0.004	149.328	1.016
PRE-TEST DIRECT_0219.LAB	4/3/2014	13:09:40	13.354	8.573	0.476	-0.187	0.000	-0.292	-1.516	-0.008	0.000			0.016	149.328	1.016
PRE-TEST DIRECT_0220.LAB	4/3/2014	13:10:09	13.469	8.574	0.486	-0.080	0.000	-0.358	-1.523	-0.014	-0.002			0.018	149.328	1.016
PRE-TEST DIRECT_0221.LAB	4/3/2014	13:10:38	13.554	8.575	0.493	-0.359	0.001	-0.344	-1.529	0.037	0.006			0.018	149.430	1.016
PRE-TEST DIRECT_0222.LAB	4/3/2014	13:11:08	13.612	8.566	0.498	-0.005	0.001	-0.235	-1.536	-0.021	0.000			0.011	149.430	1.016
PRE-TEST DIRECT_0223.LAB	4/3/2014	13:11:37	13.714	8.562	0.503	-0.133	0.000	-0.447	-1.489	0.003	0.002			0.011	149.227	1.016
PRE-TEST DIRECT_0224.LAB	4/3/2014	13:12:06	13.800	8.574	0.514	-0.194	0.000	-0.251	-1.513	-0.010	-0.008			0.019	149.430	1.016
PRE-TEST DIRECT_0225.LAB	4/3/2014	13:12:35	13.939	8.576	0.521	-0.215	0.000	-0.221	-1.528	-0.016	0.005			0.018	149.430	1.016
PRE-TEST DIRECT_0226.LAB	4/3/2014	13:13:04	13.937	8.567	0.525	0.064	0.000	-0.124	-1.517	-0.001	0.004			0.010	149.328	1.016
PRE-TEST DIRECT_0227.LAB	4/3/2014	13:13:33	14.007	8.560	0.534	-0.166	0.001	-0.438	-1.494	0.005	0.000			0.016	149.430	1.016
PRE-TEST DIRECT_0228.LAB	4/3/2014	13:14:02	14.093	8.566	0.541	-0.280	0.000	-0.389	-1.494	-0.001	0.002			0.016	149.430	1.015
PRE-TEST DIRECT_0229.LAB	4/3/2014	13:14:31	14.134	8.562	0.546	-0.128	0.000	-0.318	-1.492	0.026	0.005			0.010	149.328	1.015
PRE-TEST DIRECT_0230.LAB	4/3/2014	13:15:00	14.102	8.551	0.550	-0.066	0.000	-0.326	-1.479	0.028	0.001			0.012	149.227	1.016
PRE-TEST DIRECT_0231.LAB	4/3/2014	13:15:29	14.238	8.556	0.553	-0.236	0.000	-0.252	-1.477	0.020	-0.001			0.009	149.227	1.016
PRE-TEST DIRECT_0232.LAB	4/3/2014	13:15:58	14.312	8.554	0.559	-0.094	0.000	-0.426	-1.488	0.007	-0.011			0.014	149.125	1.016
PRE-TEST DIRECT_0233.LAB	4/3/2014	13:16:27	14.366	8.562	0.563	-0.143	0.000	-0.312	-1.519	0.008	-0.004			0.006	149.227	1.015
PRE-TEST DIRECT_0234.LAB	4/3/2014	13:16:56	14.431	8.556	0.567	-0.021	0.000	-0.297	-1.497	0.003	-0.004			0.019	149.125	1.016
PRE-TEST DIRECT_0235.LAB	4/3/2014	13:17:25	14.559	8.562	0.571	-0.150	0.000	-0.279	-1.480	-0.003	-0.003			0.011	149.125	1.015
PRE-TEST DIRECT_0236.LAB	4/3/2014	13:17:54	14.522	8.560	0.573	-0.313	0.000	-0.217	-1.494	-0.020	-0.013			0.016	149.125	1.016
PRE-TEST DIRECT_0237.LAB	4/3/2014	13:18:23	14.653	8.565	0.577	0.005	0.000	0.108	-1.501	-0.016	0.000			0.014	148.921	1.016
PRE-TEST DIRECT_0238.LAB	4/3/2014	13:18:52	14.732	8.576	0.584	-0.117	0.000	-0.543	-1.488	0.009	-0.002			0.008	149.125	1.015
PRE-TEST DIRECT_0239.LAB	4/3/2014	13:19:21	14.736	8.573	0.586	0.019	0.000	-0.431	-1.496	0.042	-0.003			0.010	149.125	1.016
PRE-TEST DIRECT_0240.LAB	4/3/2014	13:19:50	14.764	8.567	0.590	-0.074	0.000	-0.351	-1.498	0.014	-0.005			0.013	149.125	1.016
PRE-TEST DIRECT_0241.LAB	4/3/2014	13:20:19	14.798	8.568	0.597	-0.128	0.000	-0.181	-1.499	-0.002	0.007			0.008	149.125	1.016
PRE-TEST DIRECT_0242.LAB	4/3/2014	13:20:48	14.868	8.581	0.603	-0.048	0.000	-0.190	-1.515	0.005	-0.007			0.005	149.430	1.015
PRE-TEST DIRECT_0243.LAB	4/3/2014	13:21:17	14.901	8.572	0.607	-0.057	0.000	-0.161	-1.521	0.004	0.001			0.011	149.125	1.015
PRE-TEST DIRECT_0244.LAB	4/3/2014	13:21:46	14.932	8.568	0.609	-0.117	0.000	-0.142	-1.476	0.017	-0.004			0.015	149.227	1.016
PRE-TEST DIRECT_0245.LAB	4/3/2014	13:22:15	14.969	8.571	0.615	-0.214	0.000	-0.367	-1.526	0.021	-0.005			0.009	149.125	1.016
PRE-TEST DIRECT_0246.LAB	4/3/2014	13:22:44	14.989	8.582	0.624	-0.188	0.000	-0.330	-1.487	0.040	-0.014			0.011	149.430	1.015
PRE-TEST DIRECT_0247.LAB	4/3/2014	13:23:13	15.045	8.578	0.631	-0.165	0.000	-0.502	-1.481	-0.018	-0.001			0.003	149.430	1.016
PRE-TEST DIRECT_0248.LAB	4/3/2014	13:23:42	15.076	8.585	0.635	-0.176	0.000	-0.346	-1.488	0.001	-0.010			0.010	149.532	1.015
PRE-TEST DIRECT_0249.LAB	4/3/2014	13:24:12	15.055	8.576	0.640	-0.024	0.000	-0.466	-1.497	0.038	0.000			0.010	149.328	1.015
PRE-TEST DIRECT_0250.LAB	4/3/2014	13:24:41	15.049	8.572	0.648	0.044	0.000	-0.476	-1.489	0.023	-0.004			0.006	149.328	1.016
PRE-TEST DIRECT_0251.LAB	4/3/2014	13:25:10	15.240	8.565	0.699	-0.188	0.000	-0.501	-1.472	0.000	-0.009			0.009	149.227	1.016
PRE-TEST DIRECT_0252.LAB	4/3/2014	13:25:39	16.364	8.562	0.970	-0.015	0.000	-0.419	-1.465	0.011	-0.011			0.014	149.227	1.016
PRE-TEST DIRECT_0253.LAB	4/3/2014	13:26:08	18.009	8.557	1.396	-0.165	0.000	-0.109	-1.459	0.056	-0.003			0.014	149.430	1.015
PRE-TEST DIRECT_0254.LAB	4/3/2014	13:26:37	20.042	8.556	1.733	0.092	0.000	-0.032	-1.449	0.001	-0.002			0.026	149.227	1.015
PRE-TEST DIRECT_0255.LAB	4/3/2014	13:27:06	21.214	8.555	1.942	0.170	0.000	0.128	-1.452	-0.181	-0.006			0.098	149.532	1.016
PRE-TEST DIRECT_0256.LAB	4/3/2014	13:27:35	18.519	8.541	1.272	0.528	0.000	0.091	-0.523	-0.328	-0.003			0.157	149.532	1.016
PRE-TEST DIRECT_0257.LAB	4/3/2014	13:28:04	13.735	8.520	0.461	3.805	0.000	1.015	14.890	-0.449	0.009			0.242	149.430	1.016
PRE-TEST DIRECT_0258.LAB	4/3/2014	13:28:33	11.044	8.502	0.194	8.106	0.001	1.269	52.454	-0.432	-0.014			0.258	149.430	1.016
PRE-TEST DIRECT_0259.LAB	4/3/2014	13:29:02	9.995	8.489	0.117	10.915	0.001	1.336	96.459	-0.502	-0.019			0.260	149.023	1.016
PRE-TEST DIRECT_0260.LAB	4/3/2014	13:29:31	8.770	8.481	0.057	13.241	0.001	1.637	170.456	-0.721	-0.024			0.289	149.125	1.015
PRE-TEST DIRECT_0261.LAB	4/3/2014	13:30:00	7.749	8.464	0.024	14.441	0.002	1.637	284.755	-1.131	-0.031			0.351	149.328	1.015
PRE-TEST DIRECT_0262.LAB	4/3/2014	13:30:29	7.342	8.404	0.025	15.560	0.002	2.096	285.229	-1.166	-0.020			0.354	149.125	1.013
PRE-TEST DIRECT_0263.LAB	4/3/2014	13:30:58	7.250	8.449	0.047	15.802	0.002	1.800	233.188	-1.106	-0.032			0.335	149.430	1.011
PRE-TEST DIRECT_0264.LAB	4/3/2014	13:31:27	7.373	8.453	0.066	15.811	0.002	1.681	192.068	-1.047	-0.024			0.317	149.735	1.011
PRE-TEST DIRECT_0265.LAB	4/3/2014	13:31:56	7.389	8.454	0.074	16.156	0.002	1.874	162.109	-0.956	-0.026			0.307	149.532	1.010
PRE-TEST DIRECT_0266.LAB	4/3/2014	13:32:25	7.378	8.468	0.093	15.901	0.002	1.896	139.401	-0.946	-0.037			0.297	149.532	1.010
PRE-TEST DIRECT_0267.LAB	4/3/2014	13:32:54	7.458	8.473	0.091	16.066	0.002	1.577	121.798	-0.939	-0.032			0.295	149.328	1.010
PRE-TEST DIRECT_0268.LAB	4/3/2014	13:33:23	7.422	8.480	0.092	16.066	0.002	1.757	107.783	-0.900	-0.035			0.291	149.430	1.010
PRE-TEST DIRECT_0269.LAB	4/3/2014	13:33:52	7.484	8.483	0.094	16.076	0.002	2.094	96.499	-0.866	-0.027			0.277	149.328	1.010
PRE-TEST DIRECT_0270.LAB	4/3/2014	13:34:21	7.534	8.495	0.093	15.801	0.002	1.924	87.268	-0.823	-0.028			0.286	149.328	1.010
PRE-TEST DIRECT_0271.LAB	4/3/2014	13:34:50	7.566	8.496	0.090	15.936	0.003	1.725	79.543	-0.801	-0.016			0.279	149.227	1.010
PRE-TEST DIRECT_0272.LAB	4/3/2014	13:35:19	7.533	8.504	0.092	15.959	0.002	1.749	73.049	-0.784	-0.037			0.282	149.430	1.010
PRE-TEST DIRECT_0273.LAB	4/3/2014	13:35:48	7.520	8.510	0.096	16.180	0.002	1.960	67.486	-0.752	-0.027			0.273	149.328	1.010
PRE-TEST DIRECT_0274.LAB	4/3/2014	13:36:17	7.587	8.517	0.093	15.941	0.002	1.850	62.769	-0.749	-0.021			0.288	149.430	1.010
PRE-TEST DIRECT_0275.LAB	4/3/2014	13:36:46	7.644	8.519	0.092	15.830	0.002	1.968	58.632	-0.747	-0.025			0.275	149.430	1.010
PRE-TEST DIRECT_0276.LAB	4/3/2014	13:37:16	7.625	8.528	0.093	15.983	0.003	2.101	55.040	-0.752	-0.029			0.268	149.532	1.010
PRE-TEST DIRECT_0277.LAB	4/3/2014	13:37:45	7.649	8.531	0.091	15.947	0.002	1.482	51.857	-0.697	-0.026			0.278	149.430	1.010
PRE-TEST DIRECT_0278.LAB	4/3/2014	13:38:14	7.658	8.530	0.090	16.040	0.003	1.930	49.046	-0.711	-0.018			0.273	149.328	1.010
PRE-TEST DIRECT_0279.LAB	4/3/2014	13:38:43	7.614	8.526	0.090	16.134	0.003	1.900	46.399	-0.694	-0.021			0.271	149.125	1.010

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
PRE-TEST DIRECT_0280.LAB	4/3/2014	13:39:12	7.692	8.540	0.089	16.194	0.002	2.075	44.233	-0.704	-0.021			0.267	149.430	1.010
PRE-TEST DIRECT_0281.LAB	4/3/2014	13:39:41	7.630	8.546	0.089	16.194	0.002	1.530	42.160	-0.669	-0.022			0.269	149.430	1.010
PRE-TEST DIRECT_0282.LAB	4/3/2014	13:40:10	7.637	8.547	0.091	16.215	0.003	1.548	40.348	-0.646	-0.025			0.263	149.430	1.010
PRE-TEST DIRECT_0283.LAB	4/3/2014	13:40:39	7.613	8.549	0.090	16.140	0.002	1.692	38.728	-0.647	-0.019			0.255	149.532	1.010
PRE-TEST DIRECT_0284.LAB	4/3/2014	13:41:08	7.627	8.553	0.088	16.182	0.002	1.760	37.207	-0.626	-0.038			0.265	149.532	1.010
PRE-TEST DIRECT_0285.LAB	4/3/2014	13:41:37	7.684	8.557	0.087	16.221	0.002	1.650	35.825	-0.620	-0.024			0.269	149.532	1.010
PRE-TEST DIRECT_0286.LAB	4/3/2014	13:42:06	7.679	8.555	0.086	16.223	0.002	1.623	34.579	-0.627	-0.026			0.257	149.430	1.010
PRE-TEST DIRECT_0287.LAB	4/3/2014	13:42:35	7.707	8.560	0.084	16.210	0.002	1.715	33.437	-0.621	-0.038			0.264	149.430	1.010
PRE-TEST DIRECT_0288.LAB	4/3/2014	13:43:04	7.667	8.561	0.085	16.059	0.002	1.676	32.377	-0.602	-0.037			0.271	149.532	1.011
PRE-TEST DIRECT_0289.LAB	4/3/2014	13:43:33	7.697	8.564	0.083	16.047	0.002	1.688	31.383	-0.577	-0.022			0.258	149.430	1.010
PRE-TEST DIRECT_0290.LAB	4/3/2014	13:44:02	7.703	8.564	0.083	16.263	0.002	2.026	30.423	-0.612	-0.028			0.272	149.430	1.011
PRE-TEST DIRECT_0291.LAB	4/3/2014	13:44:31	7.707	8.564	0.082	16.332	0.003	1.562	29.489	-0.586	-0.020			0.258	149.328	1.010
PRE-TEST DIRECT_0292.LAB	4/3/2014	13:45:00	7.744	8.570	0.082	16.281	0.003	1.819	28.698	-0.576	-0.018			0.262	149.328	1.010
PRE-TEST DIRECT_0293.LAB	4/3/2014	13:45:29	7.720	8.570	0.081	16.371	0.003	2.210	27.931	-0.525	-0.022			0.263	149.430	1.010
PRE-TEST DIRECT_0294.LAB	4/3/2014	13:45:58	7.724	8.573	0.081	16.367	0.002	1.926	27.232	-0.565	-0.025			0.277	149.430	1.010
PRE-TEST DIRECT_0295.LAB	4/3/2014	13:46:27	7.722	8.575	0.080	16.549	0.003	2.046	26.483	-0.562	-0.029			0.259	149.430	1.010
PRE-TEST DIRECT_0296.LAB	4/3/2014	13:46:56	7.693	8.579	0.080	16.551	0.003	2.054	25.815	-0.513	-0.023			0.258	149.328	1.010
PRE-TEST DIRECT_0297.LAB	4/3/2014	13:47:25	7.629	8.581	0.078	16.484	0.003	2.152	25.164	-0.521	-0.028			0.259	149.430	1.010
PRE-TEST DIRECT_0298.LAB	4/3/2014	13:47:54	7.641	8.576	0.077	16.315	0.003	1.874	24.570	-0.495	-0.029			0.256	149.328	1.010
PRE-TEST DIRECT_0299.LAB	4/3/2014	13:48:23	7.634	8.577	0.076	16.399	0.003	1.527	24.040	-0.455	-0.027			0.266	149.125	1.010
PRE-TEST DIRECT_0300.LAB	4/3/2014	13:48:52	7.632	8.576	0.074	16.336	0.003	1.688	23.562	-0.540	-0.027			0.256	148.921	1.010
PRE-TEST DIRECT_0301.LAB	4/3/2014	13:49:21	7.627	8.578	0.075	16.559	0.003	1.956	23.104	-0.478	-0.035			0.257	149.125	1.010
PRE-TEST DIRECT_0302.LAB	4/3/2014	13:49:50	7.638	8.581	0.075	16.394	0.003	1.577	22.695	-0.489	-0.024			0.256	149.125	1.010
PRE-TEST DIRECT_0303.LAB	4/3/2014	13:50:19	7.663	8.582	0.074	16.332	0.003	1.643	22.299	-0.436	-0.018			0.260	149.023	1.010
PRE-TEST DIRECT_0304.LAB	4/3/2014	13:50:49	7.685	8.585	0.074	16.349	0.003	1.778	21.929	-0.426	-0.018			0.260	149.125	1.010
PRE-TEST DIRECT_0305.LAB	4/3/2014	13:51:18	7.653	8.580	0.072	16.421	0.003	1.722	21.527	-0.522	-0.021			0.263	149.125	1.011
PRE-TEST DIRECT_0306.LAB	4/3/2014	13:51:47	7.673	8.590	0.072	16.376	0.003	1.820	21.184	-0.497	-0.024			0.264	149.430	1.010
PRE-TEST DIRECT_0307.LAB	4/3/2014	13:52:16	7.687	8.584	0.071	16.689	0.003	1.782	20.827	-0.420	-0.031			0.268	149.227	1.010
PRE-TEST DIRECT_0308.LAB	4/3/2014	13:52:45	7.709	8.590	0.070	16.501	0.003	1.847	20.537	-0.467	-0.015			0.264	149.328	1.010
PRE-TEST DIRECT_0309.LAB	4/3/2014	13:53:14	7.713	8.585	0.069	16.430	0.003	1.994	20.168	-0.471	-0.020			0.257	149.125	1.010
PRE-TEST DIRECT_0310.LAB	4/3/2014	13:53:43	7.704	8.589	0.070	16.560	0.003	2.026	19.890	-0.462	-0.016			0.263	149.125	1.010
PRE-TEST DIRECT_0311.LAB	4/3/2014	13:54:12	7.712	8.596	0.069	16.771	0.003	1.899	19.652	-0.440	-0.013			0.263	149.430	1.010
PRE-TEST DIRECT_0312.LAB	4/3/2014	13:54:41	7.723	8.599	0.070	16.713	0.003	2.016	19.366	-0.438	-0.029			0.259	149.532	1.010
PRE-TEST DIRECT_0313.LAB	4/3/2014	13:55:10	7.715	8.598	0.069	16.800	0.003	2.122	19.124	-0.479	-0.021			0.264	149.430	1.010
PRE-TEST DIRECT_0314.LAB	4/3/2014	13:55:39	7.706	8.600	0.069	16.869	0.003	2.282	18.862	-0.442	-0.015			0.264	149.532	1.010
PRE-TEST DIRECT_0315.LAB	4/3/2014	13:56:08	7.668	8.596	0.069	16.738	0.003	2.087	18.619	-0.479	-0.021			0.257	149.430	1.010
PRE-TEST DIRECT_0316.LAB	4/3/2014	13:56:37	7.645	8.601	0.066	16.651	0.003	2.503	18.361	-0.436	-0.015			0.257	149.532	1.011
PRE-TEST DIRECT_0317.LAB	4/3/2014	13:57:06	7.619	8.603	0.066	16.789	0.003	2.207	18.132	-0.470	-0.022			0.264	149.532	1.010
PRE-TEST DIRECT_0318.LAB	4/3/2014	13:57:35	7.672	8.605	0.066	16.872	0.003	2.247	17.889	-0.421	-0.025			0.254	149.430	1.010
PRE-TEST DIRECT_0319.LAB	4/3/2014	13:58:04	7.671	8.605	0.065	17.108	0.003	2.204	17.644	-0.410	-0.017			0.253	149.430	1.010
PRE-TEST DIRECT_0320.LAB	4/3/2014	13:58:33	7.652	8.604	0.065	16.879	0.003	2.286	17.468	-0.444	-0.026			0.254	149.532	1.010
PRE-TEST DIRECT_0321.LAB	4/3/2014	13:59:02	7.651	8.606	0.065	16.956	0.003	2.155	17.277	-0.393	-0.022			0.255	149.430	1.010
PRE-TEST DIRECT_0322.LAB	4/3/2014	13:59:31	7.666	8.605	0.065	16.927	0.003	2.393	17.108	-0.393	-0.022			0.260	149.430	1.010
PRE-TEST DIRECT_0323.LAB	4/3/2014	14:00:00	7.633	8.613	0.066	17.007	0.003	2.141	16.939	-0.414	-0.026			0.269	149.634	1.010
PRE-TEST DIRECT_0324.LAB	4/3/2014	14:00:29	7.612	8.612	0.064	16.944	0.003	2.036	16.782	-0.388	-0.021			0.261	149.532	1.010
PRE-TEST DIRECT_0325.LAB	4/3/2014	14:00:58	7.623	8.610	0.064	17.042	0.003	1.776	16.581	-0.350	-0.026			0.261	149.430	1.010
PRE-TEST DIRECT_0326.LAB	4/3/2014	14:01:27	7.629	8.611	0.063	17.174	0.003	1.817	16.392	-0.389	-0.017			0.258	149.430	1.010
PRE-TEST DIRECT_0327.LAB	4/3/2014	14:01:56	7.616	8.616	0.063	16.832	0.003	2.067	16.269	-0.385	-0.022			0.260	149.430	1.010
PRE-TEST DIRECT_0328.LAB	4/3/2014	14:02:25	7.649	8.622	0.062	16.698	0.004	1.851	16.152	-0.380	-0.011			0.263	149.430	1.010
PRE-TEST DIRECT_0329.LAB	4/3/2014	14:02:54	7.633	8.615	0.061	16.915	0.004	1.525	16.025	-0.368	-0.015			0.270	149.430	1.010
PRE-TEST DIRECT_0330.LAB	4/3/2014	14:03:23	7.656	8.617	0.060	16.985	0.003	1.784	15.875	-0.386	-0.021			0.274	149.430	1.010
PRE-TEST DIRECT_0331.LAB	4/3/2014	14:03:53	7.710	8.617	0.060	17.014	0.004	1.755	15.707	-0.374	-0.020			0.274	149.430	1.010
PRE-TEST DIRECT_0332.LAB	4/3/2014	14:04:22	7.692	8.621	0.061	16.888	0.004	1.748	15.629	-0.349	-0.005			0.273	149.430	1.010
PRE-TEST DIRECT_0333.LAB	4/3/2014	14:04:51	7.723	8.624	0.062	16.699	0.003	1.713	15.494	-0.389	-0.013			0.273	149.430	1.010
PRE-TEST DIRECT_0334.LAB	4/3/2014	14:05:20	7.725	8.631	0.059	16.562	0.004	1.938	15.326	-0.349	-0.007			0.269	149.532	1.010
PRE-TEST DIRECT_0335.LAB	4/3/2014	14:05:49	7.711	8.635	0.059	17.095	0.004	1.940	15.163	-0.391	-0.008			0.268	149.328	1.010
PRE-TEST DIRECT_0336.LAB	4/3/2014	14:06:18	7.714	8.635	0.058	16.877	0.003	2.063	15.017	-0.343	-0.011			0.278	149.532	1.010
PRE-TEST DIRECT_0337.LAB	4/3/2014	14:06:47	7.754	8.640	0.059	16.938	0.004	1.979	14.920	-0.391	-0.023			0.281	149.532	1.010
PRE-TEST DIRECT_0338.LAB	4/3/2014	14:07:16	7.711	8.638	0.058	17.277	0.004	1.957	14.786	-0.388	-0.012			0.271	149.532	1.010
PRE-TEST DIRECT_0339.LAB	4/3/2014	14:07:45	7.646	8.644	0.058	17.041	0.004	2.252	14.681	-0.335	-0.013			0.278	149.430	1.010
PRE-TEST DIRECT_0340.LAB	4/3/2014	14:08:14	7.685	8.646	0.058	17.206	0.004	2.206	14.527	-0.335	-0.017			0.278	149.328	1.010
PRE-TEST DIRECT_0341.LAB	4/3/2014	14:08:43	7.683	8.644	0.057	16.940	0.004	1.947	14.380	-0.407	-0.019			0.271	149.227	1.010
PRE-TEST DIRECT_0342.LAB	4/3/2014	14:09:12	7.683	8.647	0.056	17.039	0.004	2.039	14.300	-0.360	-0.013			0.276	149.430	1.010
PRE-TEST DIRECT_0343.LAB	4/3/2014	14:09:41	7.661	8.643	0.057	17.136	0.004	2.324	14.175	-0.317	-0.014			0.274	149.227	1.010
PRE-TEST DIRECT_0344.LAB	4/3/2014	14:10:10	7.631	8.650	0.056	17.259	0.004	2.397	14.093	-0.350	-0.014			0.277	149.430	1.010
PRE-TEST DIRECT_0345.LAB	4/3/2014	14:10:39	7.681	8.647	0.057	17.231	0.004	2.297	13.972	-0.338	-0.011			0.278	149.328	1.010
PRE-TEST DIRECT_0346.LAB	4/3/2014	14:11:08	7.616	8.649	0.055	17.233	0.004	1.995	13.900	-0.293	-0.024			0.282	149.328	1.010
PRE-TEST DIRECT_0347.LAB	4/3/2014	14:11:37	7.618	8.650	0.056	17.236	0.003	2.208	13.784	-0.284	-0.017			0.270	149.328	1.010
PRE-TEST DIRECT_0348.LAB	4/3/2014	14:12:06	7.593	8.652	0.055	17.363	0.004	2.214	13.692	-0.334	-0.011			0.283	149.430	1.010
PRE-TEST DIRECT_0349.LAB	4/3/2014	14:12:35	7.642	8.656	0.054	17.274	0.004	2.195	13.649	-0.305	-0.009			0.288	149.430	1.010
PRE-TEST DIRECT_0350.LAB	4/3/2014	14:13:04	7.644	8.656	0.055	17.293	0.004	2.299	13.519	-0.350	-0.014			0.275	149.328	1.010
PRE-TEST DIRECT_0351.LAB	4/3/2014	14:13:33	7.629	8.656	0.054	17.225	0.004	2.085	13.440	-0.317	-0.033			0.284	149.227	1.010
PRE-TEST DIRECT_0352.LAB	4/3/2014	14:14:02	7.643	8.657	0.053	17.220	0.004	2.337	13.387	-0.304	-0.024			0.294	149.328	1.010
PRE-TEST DIRECT_0353.LAB	4/3/2014	14:14:31	7.625	8.655	0.053	17.449	0.004	2.122	13.290	-0.330	-0.028			0.275	149.328	1.010
PRE-TEST DIRECT_0354.LAB	4/3/2014	14:15:00	7.630	8.663	0.053	17.474	0.004	2.092	13.232	-0.275	-0.022			0.293	149.328	1.010
PRE-TEST DIRECT_0355.LAB	4/3/2014	14:15:29	7.702	8.665	0.052	17.354	0.004	2.052	13.171	-0.302	-0.005			0.290	149.430	1.010
PRE-TEST DIRECT_0356.LAB	4/3/2014	14:15:58	7.719	8.663	0.053	17.403	0.004	2.166	13.101	-0.352	-0.021			0.286	149.227	1.010
PRE-TEST DIRECT_0357.LAB	4/3/2014	14:16:27	7.709	8.665	0.053	17.349	0.004	1.895	13.057	-0.207	-0.019			0.284	149.430	1.010
PRE-TEST DIRECT_0358.LAB	4/3/2014	14:16:57	7.708	8.665	0.052	17.429	0.004	2.046	12.968	-0.291	-0.002			0.282	149.328	1.010
PRE-TEST DIRECT_0359.LAB	4/3/2014	14:17:26	7.694	8.667	0.053	17.566	0.004	2.153	12.903	-0.279	-0.010			0.286	149.430	1.010
PRE-TEST DIRECT_0360.LAB	4/3/2014	14:17:55	7.722	8.674	0.052	17.388	0.004	2.160	12.849	-0.282	-0.008			0.289	149.328	1.010
PRE-TEST DIRECT_0361.LAB	4/3/2014	14:18:24	7.706	8.672	0.052	17.437	0.004	2.144	12.742	-0.298	-0.019			0.293	149.430	1.010
PRE-TEST DIRECT_0362.LAB	4/3/2014	14:18:53	7.684	8.672	0.051	17.347	0.004	2.377	12.639	-0.320	-0.012			0.302	149.430	1.010
PRE-TEST DIRECT_0363.LAB	4/3/2014	14:19:22	7.684	8.676	0.052	17.545	0.004	2.334	12.607	-0.273	-0.019			0.289	149.430	1.010
PRE-TEST DIRECT_0364.LAB	4/3/2014	14:19:51	7.684	8.681	0.051	17.629	0.004	2.103	12.560	-0.290	-0.010			0.293	149.430	1.010
PRE-TEST DIRECT_0365.LAB	4/3/2014	14:20:20	7.679	8.677	0.050	17.715	0.004	2.114	12.515	-0.244	-0.019			0.290	149.328	1.010
PRE-TEST DIRECT_0366.LAB	4/3/2014	14:20:49	7.700	8.683	0.051	17.570	0.004	2.332	12.450	-0.320	-0.024			0.292	149.430	1.009
PRE-TEST DIRECT_0367.LAB	4/3/2014	14:21:18	7.714	8.676	0.052	17.535	0.005	2.424	12.355	-0.317	-0.017			0.304	149.227	1.010
PRE-TEST DIRECT_0368.LAB	4/3/2014	14:21:47	7.718	8.680	0.053	17.703	0.004	2.252	12.292	-0.323	-0.015			0.297	149.227	1.009
PRE-TEST DIRECT_0369.LAB	4/3/2014	14:22:16	7.674	8.679	0.052	17.640	0.004	1.972	12.270	-0.266	-0.010			0.298	149.227	1.010
PRE-TEST DIRECT_0370.LAB	4/3/2014	14:22:45	7.689	8.679	0.051	17.662	0.004	2.386	12.189	-0.320	-0.007			0.300	149.125	1.010
PRE-TEST DIRECT_0371.LAB	4/3/2014	14:23:14	7.710	8.681	0.051	17.404	0.004	2.369	12.146	-0.277	-0.005			0.299	149.125	1.009
PRE-TEST DIRECT_0372.LAB	4/3/2014	14:23:43	7.688	8.685	0.051	17.823	0.004	2.474	12.116	-0.286	-0.010			0.303	149.328	1.010
PRE-TEST DIRECT_0373.LAB	4/3/2014	14:24:12	7.722	8.684	0.049	17.432	0.004	2.486	12.023	-0.250	-0.017			0.304	149.227	1.010
PRE-TEST DIRECT_0374.LAB	4/3/2014	14:24:41	7.758	8.692	0.049	17.644	0.005	2.211	11.983	-0.325	-0.014			0.309	149.227	1.009
PRE-TEST DIRECT_0375.LAB	4/3/2014	14:25:10	7.731	8.692	0.049	17.587	0.004	1.971	11.912	-0.293	-0.015			0.306	149.125	1.010
PRE-TEST DIRECT_0376.LAB	4/3/2014	14:25:39	7.766	8.697	0.049	17.682	0.004	2.212	11.872	-0.286	-0.008			0.298	149.227	1.009
PRE-TEST DIRECT_0377.LAB	4/3/2014	14:26:08	7.698	8.692	0.049	17.907	0.004	2.379	11.830	-0.287	-0.008			0.293	149.023	1.009
PRE-TEST DIRECT_0378.LAB	4/3/2014	14:26:37	7.730	8.694	0.049	17.890	0.004	2.369	11.733	-0.291	-0.012			0.302	149.125	1.010
PRE-TEST DIRECT_0379.LAB	4/3/2014	14:27:06	7.748	8.697	0.048	17.819	0.005	2.405	11.723	-0.245	-0.008			0.304	149.125	1.009
PRE-TEST DIRECT_0380.LAB	4/3/2014	14:27:35	7.683	8.703	0.050	17.818	0.004	2.451	11.702	-0.229	-0.015			0.316	149.125	1.009
PRE-TEST DIRECT_0381.LAB	4/3/2014	14:28:04	7.672	8.697	0.047	17.774	0.004	2.351	11.605	-0.213	-0.016			0.309	148.921	1.010
PRE-TEST DIRECT_0382.LAB	4/3/2014	14:28:33	7.706	8.700	0.048	17.616	0.005	2.245	11.576	-0.276	-0.015			0.314	149.125	1.010
PRE-TEST DIRECT_0383.LAB	4/3/2014	14:29:02	7.684	8.709	0.047	17.888	0.005	2.526	11.574	-0.254	-0.010			0.311	149.227	1.009
PRE-TEST DIRECT_0384.LAB	4/3/2014	14:29:31	7.692	8.706	0.048	17.750	0.005	2.365	11.479	-0.226	-0.018			0.320	149.125	1.010
PRE-TEST DIRECT_0385.LAB	4/3/2014	14:30:01	7.723	8.709	0.046	17.955	0.004	2.303	11.469	-0.257	-0.015			0.315	149.125	1.009
PRE-TEST DIRECT_0386.LAB	4/3/2014	14:30:30	7.791	8.710	0.046	17.699	0.005	2.293	11.431	-0.319	-0.006			0.319	149.125	1.010
PRE-TEST DIRECT_0387.LAB	4/3/2014	14:30:59	7.768	8.712	0.046	17.807	0.005	2.295	11.409	-0.282	-0.009			0.316	149.227	1.010
PRE-TEST DIRECT_0388.LAB	4/3/2014	14:31:28	7.746	8.717	0.047	17.818	0.004	2.256	11.349	-0.289	-0.010			0.316	149.125	1.009
PRE-TEST DIRECT_0389.LAB	4/3/2014	14:31:57	7.782	8.717	0.047	17.706	0.004	2.282	11.313	-0.261	-0.017			0.323	149.125	1.009
PRE-TEST DIRECT_0390.LAB	4/3/2014	14:32:26	7.770	8.721	0.046	17.705	0.004	2.317	11.286	-0.251	-0.009			0.304	149.328	1.009
PRE-TEST DIRECT_0391.LAB	4/3/2014	14:32:55	7.740	8.717	0.047	18.080	0.005	2.442	11.301	-0.266	-0.012			0.311	149.125	1.009
PRE-TEST DIRECT_0392.LAB	4/3/2014	14:33:24	7.755	8.719	0.046	18.055	0.004	2.480	11.230	-0.296	-0.012			0.314	149.227	1.010
PRE-TEST DIRECT_0393.LAB	4/3/2014	14:33:53	7.713	8.723	0.046	17.946	0.005	2.212	11.212	-0.193	-0.019			0.319	149.023	1.009
PRE-TEST DIRECT_0394.LAB	4/3/2014	14:34:22	7.747	8.728	0.045	17.929	0.005	2.267	11.107	-0.272	-0.014			0.322	149.125	1.009
PRE-TEST DIRECT_0395.LAB	4/3/2014	14:34:51	7.715	8.731	0.043	18.016	0.005	2.075	11.086	-0.255	-0.003			0.325	149.125	1.009
PRE-TEST DIRECT_0396.LAB	4/3/2014	14:35:20	7.737	8.736	0.045	17.847	0.005	2.279	10.998	-0.251	-0.013			0.326	149.125	1.009
PRE-TEST DIRECT_0397.LAB	4/3/2014	14:35:49	7.712	8.737	0.044	18.075	0.005	2.245	10.955	-0.231	-0.015			0.328	149.125	1.009
PRE-TEST DIRECT_0398.LAB	4/3/2014	14:36:18	7.722	8.741	0.046	17.855	0.005	2.319	10.956	-0.261	-0.021			0.332	149.125	1.009
PRE-TEST DIRECT_0399.LAB	4/3/2014	14:36:47	7.695	8.737	0.044	17.796	0.005	2.396	10.892	-0.234	-0.007			0.319	149.023	1.009
PRE-TEST DIRECT_0400.LAB	4/3/2014	14:37:16	7.682	8.741	0.044	18.046	0.005	2.303	10.864	-0.207	-0.013			0.330	149.023	1.009
PRE-TEST DIRECT_0401.LAB	4/3/2014	14:37:45	7.678	8.745	0.043	18.155	0.005	2.436	10.834	-0.302	-0.012			0.333	149.125	1.009
PRE-TEST DIRECT_0402.LAB	4/3/2014	14:38:14	7.662	8.740	0.044	18.015	0.005	2.112	10.805	-0.243	-0.020			0.333	148.820	1.009
PRE-TEST DIRECT_0403.LAB	4/3/2014	14:38:43	7.651	8.742	0.044	18.173	0.005	2.209	10.770	-0.253	-0.011			0.333	149.023	1.009

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
PRE-TEST DIRECT_0404.LAB	4/3/2014	14:39:12	7.661	8.744	0.042	18.228	0.005	2.488	10.783	-0.276	-0.011			0.324	149.023	1.009
PRE-TEST DIRECT_0405.LAB	4/3/2014	14:39:41	7.651	8.751	0.043	18.262	0.005	2.288	10.713	-0.223	-0.015			0.329	149.125	1.008
PRE-TEST DIRECT_0406.LAB	4/3/2014	14:40:10	7.657	8.747	0.041	17.873	0.005	2.500	10.696	-0.187	-0.014			0.326	149.125	1.010
PRE-TEST DIRECT_0407.LAB	4/3/2014	14:40:39	7.668	8.753	0.042	17.991	0.005	2.443	10.690	-0.174	-0.015			0.331	149.125	1.009
PRE-TEST DIRECT_0408.LAB	4/3/2014	14:41:08	7.675	8.754	0.041	18.311	0.005	2.464	10.661	-0.201	-0.006			0.332	149.125	1.009
PRE-TEST DIRECT_0409.LAB	4/3/2014	14:41:37	7.657	8.754	0.041	18.376	0.004	2.502	10.598	-0.236	-0.006			0.330	149.023	1.009
PRE-TEST DIRECT_0410.LAB	4/3/2014	14:42:06	7.674	8.763	0.043	18.328	0.005	2.264	10.619	-0.214	-0.007			0.328	149.125	1.009
PRE-TEST DIRECT_0411.LAB	4/3/2014	14:42:36	7.683	8.760	0.042	18.384	0.005	2.522	10.569	-0.220	-0.005			0.331	149.227	1.009
PRE-TEST DIRECT_0412.LAB	4/3/2014	14:43:05	7.667	8.759	0.041	18.603	0.005	2.504	10.567	-0.197	-0.008			0.326	149.125	1.009
PRE-TEST DIRECT_0413.LAB	4/3/2014	14:43:34	7.606	8.757	0.040	18.243	0.005	2.376	10.533	-0.228	-0.011			0.335	148.921	1.009
PRE-TEST DIRECT_0414.LAB	4/3/2014	14:44:03	7.673	8.766	0.041	18.197	0.005	2.517	10.529	-0.223	-0.012			0.338	149.125	1.009
PRE-TEST DIRECT_0415.LAB	4/3/2014	14:44:32	7.667	8.768	0.040	18.155	0.005	2.718	10.476	-0.202	-0.013			0.344	149.328	1.009
PRE-TEST DIRECT_0416.LAB	4/3/2014	14:45:01	7.667	8.772	0.040	18.357	0.005	2.497	10.477	-0.166	-0.012			0.337	149.328	1.009
PRE-TEST DIRECT_0417.LAB	4/3/2014	14:45:30	7.684	8.772	0.041	18.171	0.005	2.500	10.442	-0.202	-0.006			0.337	149.227	1.009
PRE-TEST DIRECT_0418.LAB	4/3/2014	14:45:59	7.661	8.766	0.039	18.226	0.005	2.369	10.399	-0.194	-0.014			0.345	149.125	1.009
PRE-TEST DIRECT_0419.LAB	4/3/2014	14:46:28	7.646	8.768	0.039	18.240	0.005	2.222	10.400	-0.190	-0.014			0.346	149.125	1.009
PRE-TEST DIRECT_0420.LAB	4/3/2014	14:46:57	7.672	8.774	0.039	18.403	0.005	2.337	10.433	-0.215	-0.004			0.356	149.125	1.009
PRE-TEST DIRECT_0421.LAB	4/3/2014	14:47:26	7.699	8.770	0.038	18.282	0.005	2.458	10.424	-0.210	-0.018			0.350	149.328	1.009
PRE-TEST DIRECT_0422.LAB	4/3/2014	14:47:55	7.689	8.779	0.039	18.358	0.005	2.635	10.426	-0.201	-0.013			0.355	149.430	1.009
PRE-TEST DIRECT_0423.LAB	4/3/2014	14:48:24	7.716	8.775	0.039	18.459	0.005	2.438	10.417	-0.189	-0.017			0.353	149.430	1.009
PRE-TEST DIRECT_0424.LAB	4/3/2014	14:48:53	7.719	8.778	0.040	18.489	0.005	2.591	10.380	-0.230	-0.007			0.354	149.328	1.009
PRE-TEST DIRECT_0425.LAB	4/3/2014	14:49:22	7.708	8.780	0.039	18.566	0.005	2.302	10.372	-0.166	-0.003			0.349	149.430	1.009
PRE-TEST DIRECT_0426.LAB	4/3/2014	14:49:51	7.685	8.783	0.038	18.234	0.005	2.480	10.327	-0.170	0.000			0.354	149.430	1.008
PRE-TEST DIRECT_0427.LAB	4/3/2014	14:50:20	7.721	8.778	0.038	18.364	0.005	2.652	10.351	-0.153	-0.013			0.360	149.125	1.008
PRE-TEST DIRECT_0428.LAB	4/3/2014	14:50:49	7.768	8.783	0.040	18.456	0.005	2.503	10.365	-0.194	-0.002			0.357	149.328	1.008
PRE-TEST DIRECT_0429.LAB	4/3/2014	14:51:18	7.770	8.777	0.040	18.611	0.006	2.288	10.408	-0.214	-0.007			0.350	149.227	1.008
PRE-TEST DIRECT_0430.LAB	4/3/2014	14:51:47	7.777	8.778	0.039	18.503	0.005	2.343	10.388	-0.224	-0.006			0.353	149.227	1.008
PRE-TEST DIRECT_0431.LAB	4/3/2014	14:52:16	7.787	8.784	0.039	18.635	0.005	2.556	10.384	-0.172	-0.005			0.371	149.430	1.008
PRE-TEST DIRECT_0432.LAB	4/3/2014	14:52:45	7.805	8.788	0.039	18.500	0.005	2.753	10.404	-0.243	-0.004			0.370	149.532	1.008
PRE-TEST DIRECT_0433.LAB	4/3/2014	14:53:14	7.854	8.789	0.040	18.703	0.005	2.605	10.441	-0.257	-0.009			0.365	149.735	1.008
PRE-TEST DIRECT_0434.LAB	4/3/2014	14:53:43	7.901	8.786	0.039	18.822	0.005	2.574	10.460	-0.216	-0.002			0.365	149.837	1.008
PRE-TEST DIRECT_0435.LAB	4/3/2014	14:54:12	7.903	8.771	0.039	18.442	0.005	2.450	10.447	-0.207	0.005			0.365	149.532	1.008
PRE-TEST DIRECT_0436.LAB	4/3/2014	14:54:41	7.971	8.771	0.040	18.476	0.005	2.353	10.524	-0.207	-0.002			0.367	149.735	1.009
PRE-TEST DIRECT_0437.LAB	4/3/2014	14:55:10	8.016	8.769	0.040	18.538	0.005	2.594	10.535	-0.188	0.002			0.374	149.735	1.008
PRE-TEST DIRECT_0438.LAB	4/3/2014	14:55:40	7.990	8.765	0.039	18.756	0.005	2.473	10.588	-0.233	0.001			0.381	149.939	1.008
PRE-TEST DIRECT_0439.LAB	4/3/2014	14:56:09	8.067	8.764	0.039	18.752	0.005	2.456	10.615	-0.208	0.000			0.382	149.837	1.008
PRE-TEST DIRECT_0440.LAB	4/3/2014	14:56:38	8.039	8.756	0.039	18.683	0.006	2.615	10.606	-0.209	0.007			0.388	149.634	1.008
PRE-TEST DIRECT_0441.LAB	4/3/2014	14:57:07	8.091	8.747	0.040	18.642	0.005	2.408	10.616	-0.180	0.005			0.375	149.430	1.008
PRE-TEST DIRECT_0442.LAB	4/3/2014	14:57:36	8.108	8.740	0.039	18.738	0.006	2.415	10.577	-0.175	0.002			0.380	149.430	1.008
PRE-TEST DIRECT_0443.LAB	4/3/2014	14:58:05	8.136	8.738	0.040	18.158	0.006	2.852	10.634	-0.170	-0.003			0.399	149.227	1.008
PRE-TEST DIRECT_0444.LAB	4/3/2014	14:58:34	8.175	8.736	0.040	18.776	0.006	2.592	10.641	-0.156	0.001			0.395	149.532	1.008
PRE-TEST DIRECT_0445.LAB	4/3/2014	14:59:03	8.188	8.729	0.042	18.542	0.005	2.706	10.638	-0.180	0.002			0.401	149.430	1.008
PRE-TEST DIRECT_0446.LAB	4/3/2014	14:59:32	8.222	8.726	0.040	18.408	0.005	2.533	10.622	-0.235	0.007			0.397	149.430	1.008
PRE-TEST DIRECT_0447.LAB	4/3/2014	15:00:01	8.211	8.722	0.039	18.564	0.005	2.817	10.660	-0.199	0.006			0.400	149.532	1.008
PRE-TEST DIRECT_0448.LAB	4/3/2014	15:00:30	8.185	8.724	0.041	18.632	0.006	2.696	10.659	-0.179	0.000			0.408	149.532	1.008
PRE-TEST DIRECT_0449.LAB	4/3/2014	15:00:59	8.256	8.723	0.040	18.583	0.006	2.810	10.618	-0.182	0.008			0.403	149.532	1.008
PRE-TEST DIRECT_0450.LAB	4/3/2014	15:01:28	8.253	8.720	0.039	18.731	0.006	2.758	10.638	-0.240	0.006			0.412	149.634	1.008
PRE-TEST DIRECT_0451.LAB	4/3/2014	15:01:57	8.248	8.717	0.041	18.598	0.005	2.745	10.618	-0.155	0.006			0.415	149.532	1.008
PRE-TEST DIRECT_0452.LAB	4/3/2014	15:02:26	8.248	8.716	0.040	18.802	0.005	2.795	10.603	-0.168	0.015			0.409	149.532	1.008
PRE-TEST DIRECT_0453.LAB	4/3/2014	15:50:38	0.615	8.562	1.121	-0.167	0.000	-0.113	-0.703	-0.085	0.002			-0.013	149.430	1.013
PRE-TEST DIRECT_0454.LAB	4/3/2014	15:51:07	0.722	8.575	1.208	-0.086	0.000	-0.602	-0.768	-0.077	0.011			-0.007	149.430	1.013
PRE-TEST DIRECT_0455.LAB	4/3/2014	15:51:37	4.252	8.458	0.921	-0.323	0.000	-0.501	-1.474	-0.058	0.005			-0.012	149.125	1.061
PRE-TEST DIRECT_0456.LAB	4/3/2014	15:52:06	14.855	9.057	0.600	-0.395	0.000	-0.847	-2.539	0.002	0.015			-0.023	148.921	1.031
PRE-TEST DIRECT_0457.LAB	4/3/2014	15:52:35	12.361	8.793	0.835	-0.207	0.001	-1.003	-2.016	0.016	0.003			-0.020	149.125	1.013
PRE-TEST DIRECT_0458.LAB	4/3/2014	15:53:04	5.562	8.530	1.783	-0.561	0.000	-1.209	-1.126	-0.015	0.002			-0.024	149.125	1.013
PRE-TEST DIRECT_0459.LAB	4/3/2014	15:53:33	4.288	8.542	1.670	-0.397	0.001	-0.812	-1.080	-0.048	0.024			-0.015	149.430	1.012
PRE-TEST DIRECT_0460.LAB	4/3/2014	15:54:02	3.899	8.524	1.556	-0.155	0.001	-0.956	-1.071	-0.026	0.002			-0.025	149.532	1.013
PRE-TEST DIRECT_0461.LAB	4/3/2014	15:54:31	3.848	8.530	1.512	-0.356	0.001	-0.589	-1.159	-0.049	0.017			-0.025	149.532	1.013
PRE-TEST DIRECT_0462.LAB	4/3/2014	15:55:00	16.381	8.782	0.534	-0.531	0.000	-0.709	-2.460	-0.048	0.010			-0.010	149.023	1.083
PRE-TEST DIRECT_0463.LAB	4/3/2014	15:55:29	19.085	8.815	0.520	-0.707	0.001	-0.807	-2.586	0.000	0.000			-0.016	148.921	1.051
PRE-TEST DIRECT_0464.LAB	4/3/2014	15:55:58	18.196	8.838	0.661	-0.675	0.001	-0.653	-2.315	-0.032	-0.006			-0.022	148.921	1.025
PRE-TEST DIRECT_0465.LAB	4/3/2014	15:56:27	16.116	8.673	0.788	-0.557	0.000	-0.785	-2.098	0.004	0.005			-0.012	149.125	1.024
PRE-TEST DIRECT_0466.LAB	4/3/2014	15:56:56	16.104	8.641	0.788	-0.280	0.001	-0.650	-2.078	-0.125	0.010			-0.022	149.023	1.027
PRE-TEST DIRECT_0467.LAB	4/3/2014	15:57:25	13.634	8.613	1.227	-0.089	0.001	-0.418	-1.600	-0.081	-0.005			-0.020	149.227	1.013
PRE-TEST DIRECT_0468.LAB	4/3/2014	15:57:54	9.192	8.554	1.888	-0.424	0.000	-0.508	-1.450	-0.073	-0.012			-0.018	149.430	1.012
PRE-TEST DIRECT_0469.LAB	4/3/2014	15:58:23	7.959	8.544	1.795	-0.372	0.000	-0.656	-1.375	-0.023	-0.005			-0.011	149.227	1.013
PRE-TEST DIRECT_0470.LAB	4/3/2014	15:58:52	7.432	8.553	1.746	-0.522	0.000	-0.679	-1.399	-0.058	0.009			-0.014	149.532	1.012
PRE-TEST DIRECT_0471.LAB	4/3/2014	15:59:21	7.131	8.554	1.728	-0.533	0.000	-0.930	-1.394	-0.048	-0.005			-0.022	149.430	1.012
PRE-TEST DIRECT_0472.LAB	4/3/2014	15:59:50	6.948	8.553	1.720	-0.240	0.001	-0.737	-1.415	-0.083	0.019			-0.011	149.328	1.012
PRE-TEST DIRECT_0473.LAB	4/3/2014	16:00:19	6.773	8.556	1.718	-0.230	0.000	-0.584	-1.467	-0.054	0.011			-0.019	149.430	1.012
PRE-TEST DIRECT_0474.LAB	4/3/2014	16:00:48	6.675	8.539	1.721	-0.492	0.000	-0.871	-1.443	-0.077	0.013			-0.012	149.430	1.012
PRE-TEST DIRECT_0475.LAB	4/3/2014	16:01:17	6.637	8.541	1.730	-0.166	0.001	-0.570	-1.410	-0.027	0.001			-0.023	149.430	1.012
PRE-TEST DIRECT_0476.LAB	4/3/2014	16:03:18	6.659	8.536	1.751	-0.317	-0.001	-0.424	-1.520	-0.050	0.001			-0.029	149.634	1.012
PRE-TEST DIRECT_0477.LAB	4/3/2014	16:03:47	6.593	8.515	1.759	-0.652	0.000	-0.518	-1.469	-0.121	-0.004			-0.026	149.430	1.012
PRE-TEST DIRECT_0478.LAB	4/3/2014	16:44:23	-0.017	0.008	-0.010	-0.193	0.002	1.849	-0.082	0.087	0.045			0.194	98.962	0.993
PRE-TEST DIRECT_0479.LAB	4/3/2014	16:44:52	0.011	0.008	-0.010	-0.241	0.002	1.556	-0.078	0.088	0.046			0.200	100.285	0.993
PRE-TEST DIRECT_0480.LAB	4/3/2014	16:45:21	0.004	0.009	-0.011	-0.075	0.002	1.607	-0.075	0.092	0.046			0.198	101.709	0.991
PRE-TEST DIRECT_0481.LAB	4/3/2014	16:46:29	0.007	0.008	-0.010	-0.236	0.002	1.609	-0.047	0.094	0.041			0.237	104.965	0.993
PRE-TEST DIR#2_0001.LAB	4/3/2014	17:16:40	0.006	0.001	0.000	-0.082	0.000	0.063	0.002	0.016	-0.004	-0.053	0.031	-0.004	148.107	1.006
PRE-TEST DIR#2_0002.LAB	4/3/2014	17:17:09	0.009	0.000	-0.001	-0.042	0.000	-0.001	0.003	-0.003	0.000	-0.021	-0.022	-0.007	148.209	1.005
PRE-TEST DIR#2_0003.LAB	4/3/2014	17:17:38	-0.005	0.000	0.001	-0.029	0.000	0.022	-0.026	0.000	-0.008	-0.019	-0.002	0.000	148.209	1.005
PRE-TEST DIR#2_0004.LAB	4/3/2014	17:18:07	0.279	-0.001	0.001	-0.123	0.006	0.219	0.037	0.006	0.050	0.156	0.062	0.193	149.023	0.984
PRE-TEST DIR#2_0005.LAB	4/3/2014	17:18:36	0.969	0.011	0.001	-0.079	0.034	1.008	0.125	0.026	0.296	0.057	0.119	0.984	148.209	0.980
PRE-TEST DIR#2_0006.LAB	4/3/2014	17:19:05	2.067	-0.010	0.055	-0.681	0.072	1.967	0.955	0.187	0.630	-0.534	0.761	2.344	148.006	0.377
PRE-TEST DIR#2_0007.LAB	4/3/2014	17:23:08	16.767	8.864	0.241	0.044	0.000	-0.270	-2.755	0.043	0.001	0.157	0.031	-0.004	148.820	1.044
PRE-TEST DIR#2_0008.LAB	4/3/2014	17:23:37	18.243	8.867	0.265	0.081	0.000	-0.348	-2.600	-0.008	-0.009	0.119	0.004	-0.015	148.921	1.044
PRE-TEST DIR#2_0009.LAB	4/3/2014	17:24:06	18.707	8.808	0.299	0.191	0.000	-0.383	-2.653	-0.028	-0.003	0.189	0.012	-0.010	148.921	1.042
PRE-TEST DIR#2_0010.LAB	4/3/2014	17:24:35	19.716	8.928	0.303	0.126	0.000	-0.210	-2.733	0.032	-0.012	0.441	0.071	-0.007	148.820	1.039
PRE-TEST DIR#2_0011.LAB	4/3/2014	17:25:04	25.124	9.068	0.194	0.093	0.000	-0.305	-3.191	-0.019	-0.015	0.320	0.101	-0.018	148.107	1.329
PRE-TEST DIR#2_0012.LAB	4/3/2014	17:25:33	24.247	9.240	0.320	0.315	0.000	-0.181	-3.048	0.044	-0.034	0.232	0.068	-0.010	148.616	1.046
PRE-TEST DIR#2_0013.LAB	4/3/2014	17:26:02	21.488	8.788	0.327	0.083	0.000	-0.271	-2.741	0.037	-0.009	0.103	0.017	-0.016	148.311	1.047
PRE-TEST DIR#2_0014.LAB	4/3/2014	17:26:31	21.653	8.799	0.318	0.405	0.000	-0.333	-2.743	0.037	-0.017	0.190	0.040	-0.017	148.209	1.047
PRE-TEST DIR#2_0015.LAB	4/3/2014	17:27:00	21.786	8.896	0.346	0.050	0.000	-0.363	-2.726	0.013	-0.010	0.206	0.049	-0.009	148.311	1.029
PRE-TEST DIR#2_0016.LAB	4/3/2014	17:27:29	20.418	8.725	0.444	0.111	0.000	-0.416	-2.511	0.023	-0.020	0.077	0.034	-0.013	148.616	1.029
PRE-TEST DIR#2_0017.LAB	4/3/2014	17:27:58	20.171	8.702	0.435	-0.146	0.000	-0.384	-2.504	-0.003	-0.009	0.154	0.058	-0.017	148.718	1.031
PRE-TEST DIR#2_0018.LAB	4/3/2014	17:28:28	20.255	8.718	0.432	0.065	-0.001	-0.389	-2.526	-0.010	-0.022	0.158	0.037	-0.011	148.718	1.030
PRE-TEST DIR#2_0019.LAB	4/3/2014	17:28:57	20.385	8.724	0.431	-0.113	-0.001	-0.384	-2.487	0.049	-0.027	0.164	0.023	-0.011	148.820	1.029
PRE-TEST DIR#2_0020.LAB	4/3/2014	17:29:26	20.563	8.791	0.439	0.092	0.000	-0.466	-2.525	0.039	-0.020	0.314	0.051	-0.015	148.921	1.019
PRE-TEST DIR#2_0021.LAB	4/3/2014	17:29:55	18.510	8.643	0.670	0.095	0.000	-0.410	-2.340	0.013	-0.014	0.155	0.054	-0.021	148.921	1.019
PRE-TEST DIR#2_0022.LAB	4/3/2014	17:30:24	17.966	8.652	0.669	0.058	0.000	-0.487	-2.306	0.038	-0.018	0.320	0.016	-0.020	149.125	1.018
PRE-TEST DIR#2_0023.LAB	4/3/2014	17:30:53	17.845	8.652	0.665	0.231	0.000	-0.622	-2.303	0.063	-0.011	0.222	0.047	-0.023	149.023	1.018
PRE-TEST DIR#2_0024.LAB	4/3/2014	17:31:22	17.836	8.656	0.659	0.133	0.000	-0.413	-2.306	0.061	-0.019	0.048	0.067	-0.016	149.125	1.018
PRE-TEST DIR#2_0025.LAB	4/3/2014	17:31:51	17.849	8.654	0.654	0.009	0.000	-0.495	-2.290	0.015	-0.025	0.178	0.070	-0.020	149.125	1.018
PRE-TEST DIR#2_0026.LAB	4/3/2014	17:32:20	17.921	8.647	0.648	-0.030	0.000	-0.494	-2.307	0.065	-0.016	0.142	0.034	-0.012	149.125	1.019
PRE-TEST DIR#2_0027.LAB	4/3/2014	17:32:49	17.978	8.655	0.644	-0.145	-0.001	-0.709	-2.318	0.028	-0.025	0.067	0.037	-0.024	149.125	1.018
PRE-TEST DIR#2_0028.LAB	4/3/2014	17:33:18	18.069	8.656	0.642	0.082	0.000	-0.496	-2.287	0.021	-0.026	0.132	0.043	-0.022	149.227	1.018
PRE-TEST DIR#2_0029.LAB	4/3/2014	17:33:47	18.183	8.651	0.639	-0.128	0.000	-0.614	-2.301	0.079	-0.019	0.210	0.056	-0.021	149.125	1.018
PRE-TEST DIR#2_0030.LAB	4/3/2014	17:34:16	18.276	8.650	0.637	-0.104	-0.001	-0.549	-2.307	0.013	-0.021	0.213	0.065	-0.023	149.023	1.018
PRE-TEST DIR#2_0031.LAB	4/3/2014	17:34:45	17.683	8.653	0.754	-0.013	0.000	-0.411	-2.207	0.050	-0.008	0.143	0.049	-0.023	149.227	1.011
PRE-TEST DIR#2_0032.LAB	4/3/2014	17:35:14	14.019	8.557	1.499	0.143	-0.001	-0.581	-1.998	0.012	-0.018	0.233	0.034	-0.021	149.227	1.011
PRE-TEST DIR#2_0033.LAB	4/3/2014	17:35:43	12.810	8.558	1.523	0.077	0.000	-0.388	-1.970	-0.001	-0.012	0.291	0.044	-0.023	149.328	1.011
PRE-TEST DIR#2_0034.LAB	4/3/2014	17:36:12	12.153	8.557	1.488	0.168	-0.001	-0.301	-1.998	0.013	-0.009	0.194	0.062	-0.025	149.328	1.011
PRE-TEST DIR#2_0035.LAB	4/3/2014	17:36:41	11.792	8.557	1.461	0.063	-0.001	-0.285	-1.998	0.015	-0.023	0.088	0.071	-0.025	149.430	1.011
PRE-TEST DIR#2_0036.LAB	4/3/2014	17:37:10	11.585	8.560	1.441	0.042	-0.001	-0.304	-2.003	0.001	-0.024	0.168	0.087	-0.026	149.430	1.011
PRE-TEST DIR#2_0037.LAB	4/3/2014	17:37:39	11.371	8.558	1.426	0.264	-0.001	-0.614	-2.023	0.026	-0.027	0.102	0.043	-0.021	149.430	1.011
PRE-TEST DIR#2_0038.LAB	4/3/2014	17:38:08	11.269	8.561	1.415	0.109	-0.001	-0.515	-2.004	0.073	-0.017	0.189	0.078	-0.022	149.328	1.011
PRE-TEST DIR#2_0039.LAB	4/3/2014	17:38:37	11.196	8.561	1.400	0.140	0.000	-0.554	-1.987	0.027	-0.019	0.151	0.044	-0.029	149.532	1.011
PRE-TEST DIR#2_0040.LAB	4/3/2014	17:39:06	11.389	8.556	1.297	0.080	-0.001	-0.632	-2.008	0.007	-0.021	0.263	0.063	-0.028	149.328	1.012
PRE-TEST DIR#2_0041.LAB	4/3/2014	17:39:35	12.127	8.561	1.230	0.091	-0.001	-0.521	-2.013	0.004	-0.020	0.126	0.098	-0.032	149.430	1.011
PRE-TEST DIR#2_0042.LAB	4/3/2014	17:40:04	12.444	8.566	1.285	-0.020	-0.001	-0.494	-1.992	-0.012	-0.022	0.118	0.081	-0.022	149.430	1.011
PRE-TEST DIR#2_0043.LAB	4/3/2014	17:40:33	12.598	8.569	1.286	0.024	-0.001	-0.377	-2.023	0.033	-0.022	0.208	0.078	-0.023	149.532	1.011
PRE-TEST DIR#2_0044.LAB	4/3/2014	17:41:03	12.634	8.566	1.274	0.270	-0.001	-0.419	-2.021	-0.002	-0.017	0.130	0.082	-0.023	149.532	1.011
PRE-TEST DIR#2_0045.LAB	4/3/2014	17:41:32	12.737	8.571	1.264	0.214	-0.001	-0.751	-2.024	0.066	-0.025	0.205	0.090	-0.029	149.634	1.011
PRE-TEST DIR#2_0046.LAB	4/3/2014	17:42:01	12.745	8.568	1.256	0.211	-0.001	-0.590	-2.015	0.005	-0.022	0.170	0.073	-0.033	149.532	1.011

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
PRE-TEST DIR#2_0047.LAB	4/3/2014	17:42:30	12.812	8.570	1.246	0.067	-0.001	-0.417	-2.027	0.021	-0.022	0.192	0.068	-0.019	149.532	1.011
PRE-TEST DIR#2_0048.LAB	4/3/2014	17:42:59	12.761	8.568	1.232	-0.082	-0.001	-0.463	-2.024	0.010	-0.027	0.230	0.077	-0.028	149.532	1.011
PRE-TEST DIR#2_0049.LAB	4/3/2014	17:43:28	12.808	8.573	1.217	0.324	-0.001	-0.524	-2.029	-0.013	-0.021	0.136	0.044	-0.023	149.532	1.011
PRE-TEST DIR#2_0050.LAB	4/3/2014	17:43:57	12.788	8.559	1.193	0.064	-0.001	-0.664	-2.011	0.001	-0.028	0.075	0.063	-0.027	149.328	1.012
PRE-TEST DIR#2_0051.LAB	4/3/2014	17:44:26	12.829	8.576	1.181	0.064	-0.001	-0.505	-2.024	0.041	-0.023	0.177	0.076	-0.025	149.532	1.011
PRE-TEST DIR#2_0052.LAB	4/3/2014	17:44:55	12.937	8.566	1.181	0.185	-0.001	-0.621	-2.024	0.054	-0.021	0.175	0.038	-0.030	149.328	1.011
PRE-TEST DIR#2_0053.LAB	4/3/2014	17:45:24	13.096	8.563	1.182	-0.165	-0.001	-0.259	-2.016	-0.004	-0.016	0.210	0.014	-0.025	149.532	1.012
PRE-TEST DIR#2_0054.LAB	4/3/2014	17:45:53	13.118	8.573	1.178	0.024	-0.001	-0.688	-2.000	0.026	-0.021	0.200	0.036	-0.033	149.430	1.011
PRE-TEST DIR#2_0055.LAB	4/3/2014	17:46:22	13.183	8.569	1.163	0.075	-0.001	-0.639	-2.026	0.030	-0.017	0.133	0.084	-0.033	149.430	1.011
PRE-TEST DIR#2_0056.LAB	4/3/2014	17:46:51	13.183	8.565	1.148	0.226	-0.001	-0.740	-2.011	0.004	-0.032	0.223	0.051	-0.037	149.430	1.011
PRE-TEST DIR#2_0057.LAB	4/3/2014	17:47:20	13.291	8.570	1.141	0.165	-0.001	-0.813	-2.022	0.006	-0.036	0.163	0.059	-0.030	149.634	1.011
PRE-TEST DIR#2_0058.LAB	4/3/2014	17:47:49	13.324	8.571	1.140	-0.094	-0.001	-0.612	-2.011	0.004	-0.022	0.229	0.080	-0.027	149.532	1.011
PRE-TEST DIR#2_0059.LAB	4/3/2014	17:48:18	13.377	8.562	1.125	0.330	0.000	-0.662	-1.995	-0.030	-0.030	0.186	0.059	-0.024	149.430	1.011
PRE-TEST DIR#2_0060.LAB	4/3/2014	17:48:47	13.368	8.559	1.099	-0.011	-0.001	-0.718	-2.027	0.033	-0.025	0.254	0.058	-0.026	149.227	1.011
PRE-TEST DIR#2_0061.LAB	4/3/2014	17:49:16	13.363	8.553	1.079	0.114	-0.001	-0.440	-2.007	-0.028	-0.022	0.213	0.044	-0.032	149.430	1.012
PRE-TEST DIR#2_0062.LAB	4/3/2014	17:49:45	13.400	8.559	1.062	0.008	-0.001	-0.536	-2.020	0.019	-0.024	0.175	0.085	-0.033	149.430	1.011
PRE-TEST DIR#2_0063.LAB	4/3/2014	17:50:14	13.439	8.553	1.048	0.024	-0.001	-0.720	-2.015	0.003	-0.032	0.239	0.093	-0.036	149.328	1.011
PRE-TEST DIR#2_0064.LAB	4/3/2014	17:50:43	13.478	8.544	1.037	-0.069	-0.001	-0.506	-2.036	0.000	-0.030	0.219	0.086	-0.038	149.125	1.012
PRE-TEST DIR#2_0065.LAB	4/3/2014	17:51:12	13.592	8.553	1.034	-0.052	0.000	-0.539	-2.002	-0.013	-0.021	0.145	0.090	-0.022	149.430	1.011
PRE-TEST DIR#2_0066.LAB	4/3/2014	17:51:41	13.619	8.552	1.023	0.067	-0.001	-0.649	-2.032	-0.020	-0.023	0.085	0.076	-0.032	149.328	1.011
PRE-TEST DIR#2_0067.LAB	4/3/2014	17:52:10	13.610	8.546	1.014	0.157	-0.001	-0.830	-1.963	0.026	-0.027	0.144	0.073	-0.035	149.227	1.011
PRE-TEST DIR#2_0068.LAB	4/3/2014	17:52:39	12.626	8.526	1.019	0.206	-0.001	-0.759	-1.888	0.003	-0.022	0.109	0.076	-0.037	149.430	1.006
PRE-TEST DIR#2_0069.LAB	4/3/2014	17:53:08	11.739	8.526	1.046	0.192	-0.001	-0.717	-1.791	0.059	-0.019	0.291	0.054	-0.034	149.532	1.005
PRE-TEST DIR#2_0070.LAB	4/3/2014	17:53:37	11.530	8.528	1.066	0.376	-0.001	-0.512	-1.766	-0.004	-0.026	0.376	0.090	-0.031	149.532	1.005
PRE-TEST DIR#2_0071.LAB	4/3/2014	17:54:07	11.502	8.531	1.082	0.344	-0.001	-0.198	-1.744	0.021	-0.026	0.474	0.105	-0.027	149.532	1.005
PRE-TEST DIR#2_0072.LAB	4/3/2014	17:54:36	11.481	8.528	1.092	0.172	-0.001	-0.425	-1.689	0.013	-0.027	0.589	0.065	-0.031	149.430	1.005
PRE-TEST DIR#2_0073.LAB	4/3/2014	17:55:05	11.443	8.535	1.099	0.433	-0.001	-0.415	-1.663	0.072	-0.032	0.525	0.063	-0.024	149.532	1.005
PRE-TEST DIR#2_0030.LAB	4/3/2014	17:34:16	18.276	8.650	0.637	-0.104	-0.001	-0.549	-2.307	0.013	-0.021	0.213	0.065	-0.023	149.023	1.018
PRE-TEST DIR#2_0031.LAB	4/3/2014	17:34:45	17.683	8.653	0.754	-0.013	0.000	-0.411	-2.207	0.050	-0.008	0.143	0.049	-0.023	149.227	1.011
PRE-TEST DIR#2_0032.LAB	4/3/2014	17:35:14	14.019	8.557	1.499	0.143	-0.001	-0.581	-1.998	0.012	-0.018	0.233	0.034	-0.021	149.227	1.011
PRE-TEST DIR#2_0033.LAB	4/3/2014	17:35:43	12.810	8.558	1.523	0.077	0.000	-0.388	-1.970	-0.001	-0.012	0.291	0.044	-0.023	149.328	1.011
PRE-TEST DIR#2_0034.LAB	4/3/2014	17:36:12	12.153	8.557	1.488	0.168	-0.001	-0.301	-1.998	0.013	-0.009	0.194	0.062	-0.025	149.328	1.011
PRE-TEST DIR#2_0035.LAB	4/3/2014	17:36:41	11.792	8.557	1.461	0.063	-0.001	-0.285	-1.998	0.015	-0.023	0.088	0.071	-0.025	149.430	1.011
PRE-TEST DIR#2_0036.LAB	4/3/2014	17:37:10	11.585	8.560	1.441	0.042	-0.001	-0.304	-2.003	0.001	-0.024	0.168	0.087	-0.026	149.430	1.011
PRE-TEST DIR#2_0037.LAB	4/3/2014	17:37:39	11.371	8.558	1.426	0.264	-0.001	-0.614	-2.023	0.026	-0.027	0.102	0.043	-0.021	149.430	1.011
PRE-TEST DIR#2_0038.LAB	4/3/2014	17:38:08	11.269	8.561	1.415	0.109	-0.001	-0.515	-2.004	0.073	-0.017	0.189	0.078	-0.022	149.328	1.011
PRE-TEST DIR#2_0039.LAB	4/3/2014	17:38:37	11.196	8.561	1.400	0.140	0.000	-0.554	-1.987	0.027	-0.019	0.151	0.044	-0.029	149.532	1.011
PRE-TEST DIR#2_0040.LAB	4/3/2014	17:39:06	11.389	8.556	1.297	0.080	-0.001	-0.632	-2.008	0.007	-0.021	0.263	0.063	-0.028	149.328	1.012
PRE-TEST DIR#2_0041.LAB	4/3/2014	17:39:35	12.127	8.561	1.230	0.091	-0.001	-0.521	-2.013	0.004	-0.020	0.126	0.098	-0.032	149.430	1.011
PRE-TEST DIR#2_0042.LAB	4/3/2014	17:40:04	12.444	8.566	1.285	-0.020	-0.001	-0.494	-1.992	-0.012	-0.022	0.118	0.081	-0.022	149.430	1.011
PRE-TEST DIR#2_0043.LAB	4/3/2014	17:40:33	12.598	8.569	1.286	0.024	-0.001	-0.377	-2.023	0.033	-0.022	0.208	0.078	-0.023	149.532	1.011
PRE-TEST DIR#2_0044.LAB	4/3/2014	17:41:03	12.634	8.566	1.274	0.270	-0.001	-0.419	-2.021	-0.002	-0.017	0.130	0.082	-0.023	149.532	1.011
PRE-TEST DIR#2_0045.LAB	4/3/2014	17:41:32	12.737	8.571	1.264	0.214	-0.001	-0.751	-2.024	0.066	-0.025	0.205	0.090	-0.029	149.634	1.011
PRE-TEST DIR#2_0046.LAB	4/3/2014	17:42:01	12.745	8.568	1.256	0.211	-0.001	-0.590	-2.015	0.005	-0.022	0.170	0.073	-0.033	149.532	1.011
PRE-TEST DIR#2_0047.LAB	4/3/2014	17:42:30	12.812	8.570	1.246	0.067	-0.001	-0.417	-2.027	0.021	-0.022	0.192	0.068	-0.019	149.532	1.011
PRE-TEST DIR#2_0048.LAB	4/3/2014	17:42:59	12.761	8.568	1.232	-0.082	-0.001	-0.463	-2.024	0.010	-0.027	0.230	0.077	-0.028	149.532	1.011
PRE-TEST DIR#2_0049.LAB	4/3/2014	17:43:28	12.808	8.573	1.217	0.324	-0.001	-0.524	-2.029	-0.013	-0.021	0.136	0.044	-0.023	149.532	1.011
PRE-TEST DIR#2_0050.LAB	4/3/2014	17:43:57	12.788	8.559	1.193	0.064	-0.001	-0.664	-2.011	0.001	-0.028	0.075	0.063	-0.027	149.328	1.012
PRE-TEST DIR#2_0051.LAB	4/3/2014	17:44:26	12.829	8.576	1.181	0.064	-0.001	-0.505	-2.024	0.041	-0.023	0.177	0.076	-0.025	149.532	1.011
PRE-TEST DIR#2_0052.LAB	4/3/2014	17:44:55	12.937	8.566	1.181	0.185	-0.001	-0.621	-2.024	0.054	-0.021	0.175	0.038	-0.030	149.328	1.011
PRE-TEST DIR#2_0053.LAB	4/3/2014	17:45:24	13.096	8.563	1.182	-0.165	-0.001	-0.259	-2.016	-0.004	-0.016	0.210	0.014	-0.025	149.532	1.012
PRE-TEST DIR#2_0054.LAB	4/3/2014	17:45:53	13.118	8.573	1.178	0.024	-0.001	-0.688	-2.000	0.026	-0.021	0.200	0.036	-0.033	149.430	1.011
PRE-TEST DIR#2_0055.LAB	4/3/2014	17:46:22	13.183	8.569	1.163	0.075	-0.001	-0.639	-2.026	0.030	-0.017	0.133	0.084	-0.033	149.430	1.011
PRE-TEST DIR#2_0056.LAB	4/3/2014	17:46:51	13.183	8.565	1.148	0.226	-0.001	-0.740	-2.011	0.004	-0.032	0.223	0.051	-0.037	149.430	1.011
PRE-TEST DIR#2_0057.LAB	4/3/2014	17:47:20	13.291	8.570	1.141	0.165	-0.001	-0.813	-2.022	0.006	-0.036	0.163	0.059	-0.030	149.634	1.011
PRE-TEST DIR#2_0058.LAB	4/3/2014	17:47:49	13.324	8.571	1.140	-0.094	-0.001	-0.612	-2.011	0.004	-0.022	0.229	0.080	-0.027	149.532	1.011
PRE-TEST DIR#2_0059.LAB	4/3/2014	17:48:18	13.377	8.562	1.125	0.330	0.000	-0.662	-1.995	-0.030	-0.030	0.186	0.059	-0.024	149.430	1.011
PRE-TEST DIR#2_0060.LAB	4/3/2014	17:48:47	13.368	8.559	1.099	-0.011	-0.001	-0.718	-2.027	0.033	-0.025	0.254	0.058	-0.026	149.227	1.011
PRE-TEST DIR#2_0061.LAB	4/3/2014	17:49:16	13.363	8.553	1.079	0.114	-0.001	-0.440	-2.007	-0.028	-0.022	0.213	0.044	-0.032	149.430	1.012
PRE-TEST DIR#2_0062.LAB	4/3/2014	17:49:45	13.400	8.559	1.062	0.008	-0.001	-0.536	-2.020	0.019	-0.024	0.175	0.085	-0.033	149.430	1.011
PRE-TEST DIR#2_0063.LAB	4/3/2014	17:50:14	13.439	8.553	1.048	0.024	-0.001	-0.720	-2.015	0.003	-0.032	0.239	0.093	-0.036	149.328	1.011
PRE-TEST DIR#2_0064.LAB	4/3/2014	17:50:43	13.478	8.544	1.037	-0.069	-0.001	-0.506	-2.036	0.000	-0.030	0.219	0.086	-0.038	149.125	1.012
PRE-TEST DIR#2_0065.LAB	4/3/2014	17:51:12	13.592	8.553	1.034	-0.052	0.000	-0.539	-2.002	-0.013	-0.021	0.145	0.090	-0.022	149.430	1.011
PRE-TEST DIR#2_0066.LAB	4/3/2014	17:51:41	13.619	8.552	1.023	0.067	-0.001	-0.649	-2.032	-0.020	-0.023	0.085	0.076	-0.032	149.328	1.011
PRE-TEST DIR#2_0067.LAB	4/3/2014	17:52:10	13.610	8.546	1.014	0.157	-0.001	-0.830	-1.963	0.026	-0.027	0.144	0.073	-0.035	149.227	1.011
PRE-TEST DIR#2_0068.LAB	4/3/2014	17:52:39	12.626	8.526	1.019	0.206	-0.001	-0.759	-1.888	0.003	-0.022	0.109	0.076	-0.037	149.430	1.006
PRE-TEST DIR#2_0069.LAB	4/3/2014	17:53:08	11.739	8.526	1.046	0.192	-0.001	-0.717	-1.791	0.059	-0.019	0.291	0.054	-0.034	149.532	1.005
PRE-TEST DIR#2_0070.LAB	4/3/2014	17:53:37	11.530	8.528	1.066	0.376	-0.001	-0.512	-1.766	-0.004	-0.026	0.376	0.090	-0.031	149.532	1.005
PRE-TEST DIR#2_0071.LAB	4/3/2014	17:54:07	11.502	8.531	1.082	0.344	-0.001	-0.198	-1.744	0.021	-0.026	0.474	0.105	-0.027	149.532	1.005
PRE-TEST DIR#2_0072.LAB	4/3/2014	17:54:36	11.481	8.528	1.092	0.172	-0.001	-0.425	-1.689	0.013	-0.027	0.589	0.065	-0.031	149.430	1.005
PRE-TEST DIR#2_0073.LAB	4/3/2014	17:55:05	11.443	8.535	1.099	0.433	-0.001	-0.415	-1.663	0.072	-0.032	0.525	0.063	-0.024	149.532	1.005
Pre Test QA Spikes																
PRE-TEST QA_0001.LAB	4/3/2014	18:00:55	1.812	0.044	0.030	138.604	4.900	8.565	1.029	-0.660	8.346	52.034		25.175	148.311	0.937
PRE-TEST QA_0002.LAB	4/3/2014	18:01:53	1.734	0.043	0.022	125.911	4.695	7.941	1.368	-0.641	8.257	51.666		28.153	148.107	0.938
PRE-TEST QA_0003.LAB	4/3/2014	18:02:51	1.549	0.045	0.032	156.031	4.902	8.209	1.357	-0.657	7.862	46.048		29.191	148.209	0.937
PRE-TEST QA_0004.LAB	4/3/2014	18:03:49	1.355	0.045	0.032	119.239	4.551	8.588	1.267	-0.626	7.433	52.119		29.349	148.311	0.937
PRE-TEST QA_0005.LAB	4/3/2014	18:04:47	1.190	0.055	0.031	129.076	4.652	8.968	1.166	-0.673	7.596	50.904		29.214	148.209	0.937
PRE-TEST QA_0006.LAB	4/3/2014	18:05:45	1.050	0.041	0.031	123.192	4.625	7.292	0.982	-0.605	7.619	51.127		27.497	148.514	0.943
PRE-TEST QA_0007.LAB	4/3/2014	18:06:43	0.904	0.046	0.034	154.664	5.032	8.125	0.824	-0.635	8.363	43.020		24.923	148.311	0.948
PRE-TEST QA_0008.LAB	4/3/2014	18:07:41	0.825	0.044	0.030	127.574	4.869	8.129	0.553	-0.638	8.642	46.675		23.345	148.311	0.950
PRE-TEST QA_0009.LAB	4/3/2014	18:08:40	0.782	0.039	0.035	114.771	4.638	7.876	0.611	-0.642	8.502	52.156		24.382	148.209	0.943
PRE-TEST QA_0010.LAB	4/3/2014	18:09:38	0.832	0.047	0.036	125.652	4.667	8.067	0.677	-0.652	7.839	54.609		27.524	148.311	0.941
PRE-TEST QA_0011.LAB	4/3/2014	18:10:36	0.849	0.053	0.030	166.035	4.930	8.182	0.828	-0.657	8.350	48.230		28.574	148.311	0.941
PRE-TEST QA_0012.LAB	4/3/2014	18:11:34	0.817	0.041	0.032	107.906	4.515	7.477	0.813	-0.635	7.605	54.169		28.932	148.209	0.940
PRE-TEST QA_0013.LAB	4/3/2014	18:12:32	0.755	0.050	0.037	131.097	4.753	7.587	0.996	-0.689	7.691	51.194		29.039	148.107	0.942
PRE-TEST QA_0014.LAB	4/3/2014	18:13:30	0.855	0.043	0.031	122.485	4.642	7.593	1.029	-0.665	7.781	49.910		28.528	148.107	0.943
PRE-TEST QA_0015.LAB	4/3/2014	18:14:28	0.761	0.048	0.036	123.107	4.657	8.090	0.828	-0.645	8.666	47.816		26.021	148.107	0.947
PRE-TEST QA_0016.LAB	4/3/2014	18:15:26	0.709	0.049	0.035	120.248	4.730	8.491	0.600	-0.665	8.376	52.640		24.339	148.107	0.942
PRE-TEST QA_0017.LAB	4/3/2014	18:16:24	0.621	0.038	0.034	110.469	4.467	6.974	0.690	-0.650	8.546	54.987		24.270	148.209	0.942
PRE-TEST QA_0018.LAB	4/3/2014	18:17:22	0.661	0.047	0.036	140.980	4.802	7.788	0.908	-0.671	7.779	51.945		27.789	148.209	0.943
PRE-TEST QA_0019.LAB	4/3/2014	18:18:20	0.672	0.041	0.035	107.500	4.509	7.096	1.008	-0.647	7.563	54.444		28.796	148.107	0.945
PRE-TEST QA_0020.LAB	4/3/2014	18:19:18	0.618	0.046	0.035	129.897	4.741	7.967	0.875	-0.678	6.950	50.590		29.375	148.107	0.938
PRE-TEST QA_0021.LAB	4/3/2014	18:20:16	0.578	0.045	0.040	130.668	4.703	7.895	0.965	-0.657	7.797	49.493		29.311	148.107	0.938
PRE-TEST QA_0022.LAB	4/3/2014	18:21:14	0.564	0.044	0.040	126.680	4.678	7.367	0.779	-0.638	7.734	48.142		27.653	148.209	0.939
PRE-TEST QA_0023.LAB	4/3/2014	18:22:13	0.508	0.047	0.034	102.075	4.708	8.151	0.462	-0.636	8.004	53.205		25.255	148.311	0.940
PRE-TEST QA_0024.LAB	4/3/2014	18:23:11	0.477	0.043	0.036	108.717	4.575	7.592	0.450	-0.632	7.946	53.426		23.313	148.514	0.945
PRE-TEST QA_0025.LAB	4/3/2014	18:24:09	0.446	0.049	0.036	129.231	4.937	7.617	0.528	-0.612	8.248	53.250		25.538	148.413	0.943
PRE-TEST QA_0026.LAB	4/3/2014	18:25:07	0.828	0.556	0.036	109.389	4.374	6.573	0.504	-0.592	7.602	49.766		27.526	148.209	0.942
PRE-TEST QA_0027.LAB	4/3/2014	18:26:05	1.100	0.667	0.038	119.811	4.236	6.991	0.529	-0.598	7.266	46.765		27.327	148.209	0.946
PRE-TEST QA_0028.LAB	4/3/2014	18:27:03	1.145	0.659	0.033	116.051	4.403	7.327	0.346	-0.627	7.386	46.945		27.049	148.311	0.948
PRE-TEST QA_0029.LAB	4/3/2014	18:28:01	1.193	0.648	0.035	106.459	4.294	6.479	0.357	-0.586	7.176	50.736		27.584	148.413	0.937
PRE-TEST QA_0030.LAB	4/3/2014	18:28:59	1.209	0.647	0.037	121.749	4.402	6.662	0.386	-0.594	7.470	44.496		25.746	148.514	0.951
PRE-TEST QA_0031.LAB	4/3/2014	18:29:57	1.321	0.664	0.027	114.221	4.444	6.332	0.210	-0.581	7.701	46.479		22.905	148.311	0.946
PRE-TEST QA_0032.LAB	4/3/2014	18:30:55	1.367	0.671	0.035	106.622	4.133	7.421	0.135	-0.606	7.704	51.851		23.340	148.209	0.942
PRE-TEST QA_0033.LAB	4/3/2014	18:31:53	1.325	0.658	0.039	114.306	4.490	6.891	0.356	-0.627	7.465	50.340		26.691	148.209	0.938
PRE-TEST QA_0034.LAB	4/3/2014	18:32:51	1.307	0.657	0.036	153.536	4.479	6.675	0.238	-0.619	7.913	46.141		27.963	148.209	0.939
PRE-TEST QA_0035.LAB	4/3/2014	18:33:49	1.305	0.645	0.032	122.232	4.167	6.304	0.451	-0.590	7.582	46.630		27.802	148.107	0.941
PRE-TEST QA_0036.LAB	4/3/2014	18:34:48	1.298	0.649	0.040	107.152	4.247	6.284	0.316	-0.541	7.188	51.554		27.553	148.311	0.941
PRE-TEST QA_0037.LAB	4/3/2014	18:35:46	1.310	0.648	0.032	113.312	4.396	7.006	0.355	-0.602	7.096	48.803		27.238	148.107	0.940
PRE-TEST QA_0038.LAB	4/3/2014	18:36:44	1.372	0.661	0.035	119.599	4.387	6.644	0.172	-0.583	7.649	46.324		24.213	148.311	0.945
PRE-TEST QA_0039.LAB	4/3/2014	18:37:42	1.416	0.675	0.031	103.958	4.164	6.878	0.154	-0.588	7.347	49.930		22.085	148.209	0.947
PRE-TEST QA_0040.LAB	4/3/2014	18:38:40	1.446	0.677	0.035	126.409	4.706	7.193	0.108	-0.617	7.786	46.910		23.024	148.311	0.941
PRE-TEST QA_0041.LAB	4/3/2014	18:40:07	1.365	0.644	0.032	127.200	4.338	7.305	0.155	-0.580	7.643	48.045		26.916	148.413	0.943
PRE-TEST QA_0042.LAB	4/3/2014	18:41:05	1.335	0.635	0.032	119.625	4.239	6.813	0.280	-0.628	7.524	50.013		27.921	148.311	0.945
PRE-TEST QA_0043.LAB	4/3/2014	18:42:03	1.296	0.633	0.040	132.416	4.408	7.668	0.201	-0.627	7.431	46.091		27.811	148.311	0.941
PRE-TEST QA_0044.LAB	4/3/2014	18:43:01	1.293	0.632	0.035	122.561	4.425	6.156	0.346	-0.573	7.395	46.119		27.275	148.311	0.946
PRE-TEST QA_0045.LAB	4/3/2014	18:43:59	1.340	0.652	0.037	116.552	4.314	6.872	0.195	-0.569	7.700	47.037		24.714	148.311	0.942
PRE-TEST QA_0046.LAB	4/3/2014	18:44:57	1.399	0.669	0.035	90.999	4.296	7.537	0.068	-0.560	8.525	46.211		22.363	148.311	0.943
PRE-TEST QA_0047.LAB	4/3/2014	18:45:55	1.425	0.674	0.037	102.358	4.573	8.008	-0.038	-0.585	8.198	46.428		21.157	148.311	0.949
PRE-TEST QA_0048.LAB	4/3/2014	18:46:53	1.449	0.669	0.037	99.293	4.428	9.327	-0.202	-0.638	8.539	49.310		23.083	148.311	0.944
PRE-TEST QA_0049.LAB	4/3/2014	18:47:52	1.354	0.645	0.033	90.555	4.352	8.110	0.020	-0.631	8.002	52.745		26.426	148.311	0.941
PRE-TEST QA_0050.LAB	4/3/2014	18:48:50	1.300	0.644	0.035	94.368	4.281	10.105	-0.029	-0.608	7.542	54.013		27.724	148.209	0.937
PRE-TEST QA_0051.LAB	4/3/2014	18:49:48	1.293	0.642	0.030	103.121	4.470	8.065	0.160	-0.638	7.565	48.961		27.744	148.311	0.941

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
PRE-TEST QA_0052.LAB	4/3/2014	18:50:46	1.289	0.647	0.037	109.658	4.255	9.513	0.081	-0.612	7.792	45.146		27.063	148.311	0.943
PRE-TEST QA_0053.LAB	4/3/2014	18:51:44	1.312	0.647	0.039	91.671	4.208	7.886	0.113	-0.594	7.402	51.293		26.470	148.413	0.944
PRE-TEST QA_0054.LAB	4/3/2014	18:52:42	1.316	0.656	0.034	99.748	4.375	9.744	-0.217	-0.630	7.636	49.341		25.789	148.311	0.940
PRE-TEST QA_0055.LAB	4/3/2014	18:53:40	1.346	0.663	0.034	89.514	4.141	7.993	-0.153	-0.604	7.662	51.341		23.043	148.209	0.947
PRE-TEST QA_0056.LAB	4/3/2014	18:54:38	1.380	0.672	0.034	97.773	4.252	9.526	-0.161	-0.588	7.733	45.728		21.473	148.413	0.955
PRE-TEST QA_0057.LAB	4/3/2014	18:55:36	1.431	0.683	0.039	86.124	4.115	10.043	-0.233	-0.583	7.921	53.528		20.756	148.311	0.944
PRE-TEST QA_0058.LAB	4/3/2014	18:56:34	1.432	0.667	0.037	99.735	4.353	9.488	-0.499	-0.443	7.441	51.946		24.061	148.514	0.938
PRE-TEST QA_0059.LAB	4/3/2014	18:57:32	1.260	0.434	0.036	111.618	4.773	10.878	-0.206	-0.663	7.967	48.552		27.440	148.209	0.935
PRE-TEST QA_0060.LAB	4/3/2014	18:58:30	0.669	0.060	0.038	105.848	4.717	9.337	0.334	-0.641	8.181	50.955		29.537	148.311	0.939
PRE-TEST QA_0061.LAB	4/3/2014	18:59:28	0.491	0.045	0.037	93.304	4.371	7.216	0.489	-0.643	8.623	57.757		29.435	148.311	0.942
PRE-TEST QA_0062.LAB	4/3/2014	19:00:27	0.391	0.048	0.039	98.131	4.544	7.077	0.506	-0.613	8.115	57.125		29.388	148.413	0.938
PRE-TEST QA_0063.LAB	4/3/2014	19:01:25	0.350	0.054	0.039	105.760	4.686	8.569	0.453	-0.634	7.872	50.386		28.912	148.311	0.946
PRE-TEST QA_0064.LAB	4/3/2014	19:02:23	0.322	0.052	0.037	98.043	4.575	7.329	0.411	-0.628	8.384	52.085		27.575	148.413	0.943
PRE-TEST QA_0065.LAB	4/3/2014	19:03:21	0.303	0.052	0.034	94.303	4.456	8.670	0.070	-0.609	8.563	55.710		24.780	148.311	0.939
PRE-TEST QA_0066.LAB	4/3/2014	19:04:19	0.282	0.056	0.031	101.011	4.580	9.543	0.047	-0.593	8.033	52.841		23.173	148.311	0.945
PRE-TEST QA_0067.LAB	4/3/2014	19:05:17	0.497	0.425	0.036	99.204	4.358	11.063	-0.222	-0.646	8.074	53.046		24.054	148.311	0.946
PRE-TEST QA_0068.LAB	4/3/2014	19:06:15	0.963	0.651	0.040	98.094	4.309	8.810	-0.104	-0.623	7.737	48.408		25.985	148.311	0.943
PRE-TEST QA_0069.LAB	4/3/2014	19:07:13	1.071	0.636	0.040	90.316	4.045	7.925	-0.151	-0.581	7.388	54.586		26.764	148.311	0.943
PRE-TEST QA_0070.LAB	4/3/2014	19:08:11	1.134	0.643	0.037	104.366	4.578	9.221	-0.050	-0.639	7.387	46.329		27.397	148.311	0.940
PRE-TEST QA_0071.LAB	4/3/2014	19:09:09	1.152	0.636	0.038	95.870	4.134	8.572	-0.112	-0.610	8.015	48.819		27.004	148.311	0.942
PRE-TEST QA_0072.LAB	4/3/2014	19:10:07	1.214	0.651	0.035	105.932	4.533	7.943	-0.036	-0.625	8.246	42.441		24.383	148.311	0.941
PRE-TEST QA_0073.LAB	4/3/2014	19:11:05	1.276	0.652	0.038	86.043	4.055	7.034	-0.063	-0.581	8.752	52.072		22.290	148.311	0.946
PRE-TEST QA_0074.LAB	4/3/2014	19:12:03	1.291	0.646	0.037	103.118	4.429	7.895	-0.109	-0.625	8.223	46.293		24.274	148.514	0.950
PRE-TEST QA_0075.LAB	4/3/2014	19:13:01	1.249	0.633	0.036	87.868	4.136	7.144	-0.002	-0.577	8.005	54.841		26.666	148.311	0.941
PRE-TEST QA_0076.LAB	4/3/2014	19:14:00	1.180	0.634	0.042	89.303	4.213	8.968	-0.255	-0.615	7.791	51.528		27.928	148.107	0.939
PRE-TEST QA_0077.LAB	4/3/2014	19:14:58	1.277	0.628	0.041	88.827	4.109	8.513	0.198	-0.601	7.403	50.971		27.123	148.311	0.946
PRE-TEST QA_0078.LAB	4/3/2014	19:15:56	0.931	0.079	0.042	105.478	4.746	8.584	0.446	-0.640	7.772	49.731		28.986	148.311	0.942
PRE-TEST QA_0079.LAB	4/3/2014	19:16:54	0.662	0.050	0.033	98.087	4.611	7.803	0.428	-0.614	8.302	49.172		27.059	148.209	0.943
PRE-TEST QA_0080.LAB	4/3/2014	19:17:52	0.518	0.055	0.042	103.644	4.611	8.727	0.185	-0.621	8.532	50.399		24.632	148.413	0.942
PRE-TEST QA_0081.LAB	4/3/2014	19:18:50	0.428	0.061	0.035	101.474	4.579	9.476	0.047	-0.637	8.838	51.103		23.772	148.311	0.946
PRE-TEST QA_0082.LAB	4/3/2014	19:19:48	0.349	0.063	0.032	106.695	4.836	9.460	0.001	-0.683	8.784	53.151		27.663	148.311	0.935
PRE-TEST QA_0083.LAB	4/3/2014	19:20:46	0.327	0.060	0.031	107.312	4.674	10.349	0.174	-0.657	9.230	51.322		29.061	148.413	0.936
PRE-TEST QA_0084.LAB	4/3/2014	19:21:44	0.305	0.058	0.038	113.487	4.742	9.375	0.353	-0.655	9.130	51.537		29.725	148.311	0.934
PRE-TEST QA_0085.LAB	4/3/2014	19:22:42	0.262	0.059	0.045	105.342	4.579	8.762	0.300	-0.641	8.649	51.926		29.658	148.209	0.944
PRE-TEST QA_0086.LAB	4/3/2014	19:23:40	0.237	0.065	0.042	112.565	4.557	9.992	0.062	-0.674	8.465	51.927		29.696	148.413	0.940
PRE-TEST QA_0087.LAB	4/3/2014	19:24:38	0.195	0.063	0.036	101.536	4.508	9.027	0.136	-0.670	8.375	53.314		29.032	148.311	0.949
PRE-TEST QA_0088.LAB	4/3/2014	19:25:36	0.656	0.612	0.036	88.052	4.082	6.990	0.027	-0.608	7.883	52.257		26.650	148.413	0.947
PRE-TEST QA_0089.LAB	4/3/2014	19:26:35	0.980	0.644	0.036	88.073	4.287	7.442	-0.158	-0.598	8.141	48.671		23.742	148.514	0.952
PRE-TEST QA_0090.LAB	4/3/2014	19:27:33	1.153	0.655	0.034	86.885	4.018	8.479	-0.256	-0.594	8.420	54.237		22.563	148.514	0.944
PRE-TEST QA_0091.LAB	4/3/2014	19:28:31	1.157	0.645	0.034	93.164	4.222	7.736	-0.106	-0.586	8.087	55.233		25.300	148.311	0.942
PRE-TEST QA_0092.LAB	4/3/2014	19:29:29	1.142	0.625	0.033	94.851	4.323	6.494	0.115	-0.604	8.260	48.823		26.663	148.311	0.942
PRE-TEST QA_0093.LAB	4/3/2014	19:30:27	1.175	0.622	0.046	87.440	3.913	5.207	0.152	-0.562	13.298	53.576		26.443	148.311	0.943
PRE-TEST QA_0094.LAB	4/3/2014	19:31:25	1.204	0.613	0.037	85.278	3.159	4.191	0.160	-0.537	15.771	57.691		25.396	148.311	0.946
PRE-TEST QA_0095.LAB	4/3/2014	19:32:23	1.260	0.628	0.034	81.287	3.318	4.044	0.053	-0.559	16.337	56.892		22.729	148.311	0.946
PRE-TEST QA_0096.LAB	4/3/2014	19:33:21	1.319	0.633	0.038	82.197	3.455	4.426	-0.004	-0.534	17.940	57.661		21.117	148.413	0.946
PRE-TEST QA_0097.LAB	4/3/2014	19:34:19	1.350	0.636	0.041	81.742	3.539	4.147	0.138	-0.584	19.998	60.545		21.361	148.311	0.943
PRE-TEST QA_0098.LAB	4/3/2014	19:35:17	1.293	0.618	0.039	85.765	3.558	4.106	0.210	-0.558	20.986	60.987		24.486	148.413	0.947
PRE-TEST QA_0099.LAB	4/3/2014	19:36:15	1.225	0.602	0.033	84.892	3.549	4.197	0.111	-0.578	20.277	63.258		26.136	148.311	0.946
PRE-TEST QA_0100.LAB	4/3/2014	19:37:13	0.843	0.161	0.038	91.274	3.853	4.528	0.301	-0.596	23.230	65.258		27.832	148.311	0.942
PRE-TEST QA_0101.LAB	4/3/2014	19:38:11	0.419	0.032	0.041	92.248	3.986	4.852	0.461	-0.609	23.549	63.078		28.105	148.311	0.940
PRE-TEST QA_0102.LAB	4/3/2014	19:39:09	0.303	0.030	0.039	92.167	4.038	4.606	0.287	-0.600	22.486	62.159		27.934	148.413	0.946
PRE-TEST QA_0103.LAB	4/3/2014	19:40:08	0.283	0.031	0.034	81.809	3.915	4.094	0.347	-0.544	21.247	65.954		27.017	148.311	0.947
PRE-TEST QA_0104.LAB	4/3/2014	19:41:06	0.260	0.026	0.041	73.109	3.993	3.743	0.309	-0.585	21.906	68.875		24.649	148.311	0.946
PRE-TEST QA_0105.LAB	4/3/2014	19:42:04	0.253	0.025	0.037	71.197	4.368	3.627	0.446	-0.549	21.441	63.684		23.117	148.209	0.947
PRE-TEST QA_0106.LAB	4/3/2014	19:43:02	0.246	0.031	0.034	71.617	4.531	3.794	0.322	-0.598	22.822	59.140		22.408	148.413	0.950
Run #1																
RUN#1_0001.LAB	4/4/2014	9:10:01 AM	0.338	0.038	0.020	121.622	5.170	7.371	0.770	-0.213	17.070	61.347	7.815	29.935	148.413	0.943
RUN#1_0002.LAB	4/4/2014	9:15:12 AM	0.239	0.038	0.015	111.360	5.170	7.232	0.559	-0.200	17.431	65.410	8.052	27.929	148.311	0.934
RUN#1_0003.LAB	4/4/2014	9:20:01 AM	0.169	0.040	0.018	111.636	5.014	6.652	0.659	-0.193	16.394	62.940	3.952	29.060	148.413	0.952
RUN#1_0004.LAB	4/4/2014	9:25:08 AM	0.140	0.039	0.017	119.798	5.152	6.681	0.523	-0.211	17.068	62.530	7.931	30.089	148.413	0.933
RUN#1_0005.LAB	4/4/2014	9:30:11 AM	0.135	0.038	0.019	120.880	5.264	6.741	0.490	-0.213	16.845	56.681	7.282	29.678	148.311	0.943
RUN#1_0006.LAB	4/4/2014	9:35:04 AM	0.065	0.039	0.017	123.551	5.265	6.277	0.618	-0.227	17.292	50.976	6.131	32.841	148.514	0.943
RUN#1_0007.LAB	4/4/2014	9:40:15 AM	0.079	0.042	0.017	136.759	5.514	6.810	0.369	-0.230	16.802	52.778	-0.170	31.207	148.413	0.936
RUN#1_0008.LAB	4/4/2014	9:47:23 AM	0.101	0.044	0.017	140.158	5.591	7.332	0.247	-0.214	16.451	50.337	0.704	31.531	148.514	0.942
RUN#1_0009.LAB	4/4/2014	9:53:04 AM	0.111	0.042	0.019	133.526	5.463	7.266	0.310	-0.216	16.102	53.435	7.593	30.325	148.311	0.944
RUN#1_0010.LAB	4/4/2014	10:02:01 AM	0.123	0.043	0.018	133.750	5.448	7.630	0.265	-0.209	15.372	56.830	7.800	30.390	148.413	0.944
RUN#1_0011.LAB	4/4/2014	10:07:38 AM	0.125	0.044	0.020	134.910	5.553	7.569	0.145	-0.227	15.272	55.515	7.500	30.528	148.413	0.938
Run #1 Post Test Spike																
RUN#1 QA_0001.LAB	4/4/2014	10:10:31 AM	0.141	0.042	0.020	123.960	5.224	7.269	0.022	-0.457	15.046	59.712		27.491	148.413	0.950
RUN#1 QA_0002.LAB	4/4/2014	10:11:29 AM	0.343	0.041	0.020	123.355	5.402	6.927	0.181	-0.480	15.507	59.867		27.008	149.125	0.943
RUN#1 QA_0003.LAB	4/4/2014	10:12:27 AM	0.177	0.042	0.025	130.934	5.579	6.746	0.087	-0.533	15.661	58.806		27.411	148.413	0.938
RUN#1 QA_0004.LAB	4/4/2014	10:13:25 AM	0.104	0.040	0.020	115.909	5.182	7.152	0.164	-0.555	16.203	66.435		30.779	148.413	0.936
RUN#1 QA_0005.LAB	4/4/2014	10:14:23 AM	0.063	0.040	0.015	116.613	5.130	6.197	0.151	-0.504	14.630	65.878		32.216	148.311	0.938
RUN#1 QA_0006.LAB	4/4/2014	10:15:21 AM	0.045	0.042	0.018	117.725	5.085	6.343	0.333	-0.543	14.779	65.738		32.352	148.311	0.938
RUN#1 QA_0007.LAB	4/4/2014	10:16:19 AM	0.032	0.043	0.016	186.776	5.677	7.047	0.321	-0.545	14.198	49.131		32.708	148.107	0.936
RUN#1 QA_0008.LAB	4/4/2014	10:17:17 AM	0.106	0.038	0.025	112.123	5.020	6.729	0.181	-0.519	16.016	60.302		30.093	148.209	0.943
RUN#1 QA_0009.LAB	4/4/2014	10:18:15 AM	0.160	0.042	0.025	107.299	5.066	6.393	0.293	-0.495	16.457	66.672		27.026	148.311	0.943
RUN#1 QA_0010.LAB	4/4/2014	10:19:13 AM	0.229	0.039	0.018	119.493	5.081	6.959	0.012	-0.500	15.776	63.289		25.265	148.311	0.946
RUN#1 QA_0011.LAB	4/4/2014	10:20:11 AM	0.162	0.043	0.027	124.160	5.377	6.723	0.217	-0.569	15.543	65.139		28.594	148.413	0.945
RUN#1 QA_0012.LAB	4/4/2014	10:21:10 AM	0.053	0.039	0.020	139.114	5.371	7.060	0.089	-0.579	15.391	56.361		32.540	148.311	0.936
RUN#1 QA_0013.LAB	4/4/2014	10:22:08 AM	0.253	0.462	0.018	152.087	5.194	6.676	0.000	-0.543	13.993	43.665		31.765	148.209	0.941
RUN#1 QA_0014.LAB	4/4/2014	10:23:06 AM	0.723	0.661	0.025	108.390	4.379	5.940	0.030	-0.499	15.550	54.656		30.085	148.209	0.945
RUN#1 QA_0015.LAB	4/4/2014	10:24:04 AM	0.903	0.668	0.015	126.219	4.928	6.431	-0.022	-0.525	14.572	49.380		30.572	148.107	0.940
RUN#1 QA_0016.LAB	4/4/2014	10:25:02 AM	1.141	0.680	0.020	117.365	4.712	5.996	-0.041	-0.460	14.786	52.869		27.402	148.311	0.943
RUN#1 QA_0017.LAB	4/4/2014	10:26:00 AM	1.289	0.681	0.019	111.017	4.693	6.393	-0.028	-0.453	15.280	53.828		24.882	148.311	0.947
RUN#1 QA_0018.LAB	4/4/2014	10:26:58 AM	1.266	0.665	0.019	118.085	4.799	6.211	-0.133	-0.529	15.394	56.563		27.658	148.311	0.943
RUN#1 QA_0019.LAB	4/4/2014	10:27:56 AM	1.235	0.649	0.018	112.129	4.621	5.781	0.153	-0.498	15.724	57.071		29.913	148.311	0.940
RUN#1 QA_0020.LAB	4/4/2014	10:28:54 AM	1.197	0.648	0.018	129.667	4.882	6.458	0.050	-0.528	14.567	48.824		30.376	148.107	0.943
RUN#1 QA_0021.LAB	4/4/2014	10:29:52 AM	1.250	0.649	0.015	118.001	4.677	6.525	0.100	-0.468	15.708	54.247		29.551	148.413	0.944
RUN#1 QA_0022.LAB	4/4/2014	10:30:50 AM	1.325	0.661	0.020	109.116	4.663	6.023	-0.125	-0.439	15.561	55.161		26.534	148.514	0.943
RUN#1 QA_0023.LAB	4/4/2014	10:31:48 AM	1.465	0.664	0.016	158.696	5.045	6.763	-0.067	-0.449	16.229	46.878		24.453	148.413	0.941
RUN#1 QA_0024.LAB	4/4/2014	10:32:46 AM	0.764	0.041	0.018	109.309	4.904	6.635	0.219	-0.490	17.734	67.224		25.761	148.209	0.941
RUN#1 QA_0025.LAB	4/4/2014	10:33:44 AM	0.402	0.042	0.021	132.365	5.397	6.780	0.299	-0.537	16.440	65.249		29.894	148.209	0.933
RUN#1 QA_0026.LAB	4/4/2014	10:34:43 AM	0.250	0.051	0.020	143.293	5.446	6.749	0.191	-0.588	15.922	53.308		32.549	148.413	0.933
RUN#1 QA_0027.LAB	4/4/2014	10:35:41 AM	0.197	0.044	0.016	130.827	5.293	6.423	0.248	-0.571	15.543	56.037		32.566	148.209	0.936
RUN#1 QA_0028.LAB	4/4/2014	10:36:39 AM	0.180	0.041	0.022	118.455	5.145	6.319	0.366	-0.519	16.749	59.786		32.239	148.311	0.938
RUN#1 QA_0029.LAB	4/4/2014	10:37:37 AM	0.161	0.048	0.018	137.303	5.479	6.568	0.149	-0.537	15.714	51.691		30.688	148.311	0.943
RUN#1 QA_0030.LAB	4/4/2014	10:38:35 AM	0.210	0.043	0.018	117.906	5.242	6.648	0.195	-0.546	17.989	52.459		27.143	148.514	0.950
RUN#1 QA_0031.LAB	4/4/2014	10:39:33 AM	0.262	0.038	0.013	114.368	5.145	5.977	-0.016	-0.508	18.848	62.329		25.564	148.311	0.942
RUN#1 QA_0032.LAB	4/4/2014	10:40:31 AM	0.174	0.046	0.018	129.399	5.493	7.196	0.138	-0.525	17.228	54.818		28.169	148.209	0.938
RUN#1 QA_0033.LAB	4/4/2014	10:41:29 AM	0.113	0.049	0.016	132.298	5.421	6.381	0.105	-0.538	16.591	53.906		31.761	148.311	0.944
Run #1 Post Test CTS																
RUN#1 CTS_0001.LAB	4/4/2014	10:46:59 AM	0.000	0.006	0.006	13.300	0.001	0.226	-0.024	0.043	-0.032	17.161		0.016	149.023	1.027
RUN#1 CTS_0002.LAB	4/4/2014	10:47:57 AM	-0.001	0.006	0.007	13.280	0.001	0.055	-0.036	0.033	-0.031	17.122		0.015	148.921	1.030
RUN#1 CTS_0003.LAB	4/4/2014	10:48:55 AM	-0.001	0.005	0.007	13.253	0.001	-0.114	-0.052	0.019	-0.029	17.179		0.007	148.718	1.027
RUN#1 CTS_0004.LAB	4/4/2014	10:49:53 AM	0.002	0.006	0.007	13.456	0.001	-0.108	-0.064	0.034	-0.029	17.299		0.009	149.125	1.012
Run #2																
RUN#2_0001.LAB	4/4/2014	11:09:38 AM	0.184	0.042	0.009	151.613	5.467	6.753	0.295	-0.235	14.864	48.101	5.708	32.742	148.311	0.934
RUN#2_0002.LAB	4/4/2014	11:13:02 AM	0.236	0.040	0.013	127.089	5.234	7.029	0.282	-0.202	16.039	56.700	7.800	28.705	148.311	0.930
RUN#2_0003.LAB	4/4/2014	11:15:26 AM	0.166	0.045	0.011	131.831	5.264	6.618	0.307	-0.228	15.840	60.524	-0.850	31.653	148.311	0.927
RUN#2_0004.LAB	4/4/2014	11:17:50 AM	0.131	0.046	0.012	137.615	5.214	6.125	0.208	-0.188	15.195	58.807	6.892	32.748	148.209	0.929
RUN#2_0005.LAB	4/4/2014	11:21:20 AM	0.194	0.044	0.012	125.666	5.108	6.632	0.188	-0.211	15.487	60.129	6.641	27.378	148.209	0.935
RUN#2_0006.LAB	4/4/2014	11:23:44 AM	0.135	0.041	0.011	135.871	5.179	6.491	0.203	-0.219	16.320	59.140	5.124	31.856	148.311	0.929
RUN#2_0007.LAB	4/4/2014	11:26:08 AM	0.087	0.040	0.011	123.500	5.067	5.965	0.303	-0.229	15.741	61.386	3.797	32.889	148.311	0.928
RUN#2_0008.LAB	4/4/2014	11:29:12 AM	0.151	0.039	0.015	133.265	5.083	6.831	0.244	-0.215	16.378	56.949	9.478	28.079	148.311	0.935
RUN#2_0009.LAB	4/4/2014	11:31:36 AM	0.075	0.045	0.011	149.001	5.216	6.980	0.152	-0.221	15.793	55.368	4.370	32.732	148.209	0.927
RUN#2_0010.LAB	4/4/2014	11:34:00 AM	0.077	0.038	0.013	121.772	4.948	5.688	0.203	-0.234	16.679	61.047	3.457	32.519	148.413	0.935
RUN#2_0011.LAB	4/4/2014	11:36:31 AM	0.158	0.042	0.011	153.170	5.131	7.122	0.137	-0.224	16.605	54.824	8.831	27.774	148.413	0.934

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
RUN#2_0012.LAB	4/4/2014	11:39:28 AM	0.065	0.041	0.009	135.428	5.195	6.349	0.186	-0.233	16.361	54.632	-0.041	31.528	148.209	0.933
RUN#2_0013.LAB	4/4/2014	11:41:52 AM	0.042	0.042	0.009	140.029	5.208	5.667	0.192	-0.234	16.089	51.941	4.600	33.257	148.413	0.932
RUN#2_0014.LAB	4/4/2014	11:44:30 AM	0.056	0.046	0.013	144.339	5.378	6.667	0.212	-0.250	16.579	50.517	8.452	30.473	148.209	0.924
RUN#2_0015.LAB	4/4/2014	11:46:54 AM	0.003	0.046	0.005	155.803	5.310	6.877	0.258	-0.242	16.523	47.871	9.731	34.558	148.209	0.931
RUN#2_0016.LAB	4/4/2014	11:49:18 AM	0.039	0.040	0.012	154.113	5.324	6.501	0.182	-0.232	16.249	46.676	5.351	32.049	148.311	0.939
RUN#2_0017.LAB	4/4/2014	11:52:02 AM	0.025	0.043	0.011	154.071	5.487	8.117	0.135	-0.220	16.883	46.680	8.208	29.726	148.006	0.939
RUN#2_0018.LAB	4/4/2014	11:54:26 AM	0.007	0.047	0.013	157.448	5.302	6.808	0.232	-0.221	15.989	53.371	7.936	34.288	148.107	0.924
RUN#2_0019.LAB	4/4/2014	11:57:04 AM	0.007	0.044	0.005	156.438	5.383	6.644	0.099	-0.233	15.722	47.270	4.851	32.591	148.413	0.934
RUN#2_0020.LAB	4/4/2014	12:00:07 PM	0.035	0.046	0.011	131.557	5.329	6.652	0.230	-0.199	16.128	54.303	8.130	30.332	148.209	0.929
RUN#2_0021.LAB	4/4/2014	12:02:32 PM	-0.002	0.047	0.009	152.403	5.431	5.857	0.126	-0.217	14.928	48.836	6.700	34.064	148.209	0.927
RUN#2_0022.LAB	4/4/2014	12:05:22 PM	0.072	0.042	0.006	161.270	5.394	6.832	0.076	-0.224	15.282	45.956	11.621	28.848	148.413	0.941
RUN#2_0023.LAB	4/4/2014	12:08:06 PM	0.027	0.043	0.011	146.543	5.495	6.265	0.096	-0.234	15.544	49.069	8.611	30.433	148.107	0.933
RUN#2_0024.LAB	4/4/2014	12:10:43 PM	0.039	0.041	0.012	135.971	5.283	6.179	0.009	-0.208	14.146	50.628	4.412	31.410	148.107	0.939
RUN#2_0025.LAB	4/4/2014	12:13:14 PM	0.039	0.047	0.010	138.767	5.369	6.616	0.094	-0.221	14.642	52.108	3.721	29.448	148.107	0.931
RUN#2_0026.LAB	4/4/2014	12:15:38 PM	-0.009	0.045	0.008	148.416	5.296	6.254	0.196	-0.215	14.115	52.263	7.145	34.171	148.209	0.931
RUN#2_0027.LAB	4/4/2014	12:18:03 PM	-0.020	0.050	0.012	145.350	5.170	6.397	0.169	-0.212	14.432	55.172	6.438	33.874	148.413	0.933
RUN#2_0028.LAB	4/4/2014	12:20:47 PM	0.115	0.046	0.012	129.658	5.120	6.488	0.122	-0.229	14.606	56.453	7.046	27.040	148.413	0.939
Run #2 Post Test Spike																
RUN#2 QA_0001.LAB	4/4/2014	12:25:14 PM	-0.047	0.044	0.011	133.017	5.026	5.655	0.251	-0.550	15.097	59.600		33.061	148.311	0.930
RUN#2 QA_0002.LAB	4/4/2014	12:26:12 PM	0.033	0.046	0.013	178.684	5.730	6.103	0.121	-0.551	14.463	44.961		33.039	148.514	0.930
RUN#2 QA_0003.LAB	4/4/2014	12:27:10 PM	0.073	0.046	0.013	140.746	5.027	6.234	-0.028	-0.517	14.890	56.341		27.549	148.209	0.934
RUN#2 QA_0004.LAB	4/4/2014	12:28:08 PM	0.122	0.044	0.015	125.988	5.154	6.892	0.062	-0.531	15.072	55.385		25.772	148.209	0.941
RUN#2 QA_0005.LAB	4/4/2014	12:29:06 PM	0.025	0.047	0.014	139.195	5.445	6.161	0.091	-0.587	14.651	53.864		28.107	148.209	0.932
RUN#2 QA_0006.LAB	4/4/2014	12:30:04 PM	-0.021	0.039	0.011	140.330	5.323	5.536	0.103	-0.541	14.543	52.897		31.646	147.904	0.930
RUN#2 QA_0007.LAB	4/4/2014	12:31:02 PM	-0.013	0.206	0.008	144.089	5.286	6.440	-0.064	-0.543	13.594	48.895		31.972	148.209	0.934
RUN#2 QA_0008.LAB	4/4/2014	12:32:01 PM	0.448	0.675	0.012	134.473	4.651	6.106	-0.121	-0.517	13.390	49.819		30.022	148.209	0.931
RUN#2 QA_0009.LAB	4/4/2014	12:32:59 PM	0.700	0.670	0.019	124.027	4.657	5.853	-0.217	-0.507	13.027	51.829		29.841	148.311	0.935
RUN#2 QA_0010.LAB	4/4/2014	12:33:57 PM	0.872	0.675	0.012	135.900	4.754	5.815	-0.128	-0.511	13.149	50.811		27.308	148.006	0.937
RUN#2 QA_0011.LAB	4/4/2014	12:34:55 PM	1.042	0.685	0.014	118.282	4.706	5.726	-0.210	-0.472	13.484	48.898		24.785	148.209	0.938
RUN#2 QA_0012.LAB	4/4/2014	12:35:53 PM	1.127	0.692	0.018	124.166	4.795	5.299	-0.114	-0.504	13.859	51.666		25.525	148.311	0.936
RUN#2 QA_0013.LAB	4/4/2014	12:36:51 PM	1.018	0.667	0.006	121.099	4.610	6.125	-0.169	-0.506	13.498	55.484		28.918	148.209	0.935
RUN#2 QA_0014.LAB	4/4/2014	12:37:49 PM	0.970	0.663	0.012	194.524	5.114	6.747	-0.032	-0.545	13.435	41.792		30.351	148.107	0.936
RUN#2 QA_0015.LAB	4/4/2014	12:38:47 PM	1.006	0.661	0.017	131.042	4.501	5.733	-0.145	-0.558	13.892	52.044		30.445	148.311	0.935
RUN#2 QA_0016.LAB	4/4/2014	12:39:45 PM	1.000	0.656	0.016	161.708	4.940	6.128	-0.092	-0.547	13.521	42.278		30.757	148.107	0.932
RUN#2 QA_0017.LAB	4/4/2014	12:40:43 PM	0.479	0.130	0.011	133.627	4.940	6.288	0.129	-0.525	14.764	54.446		32.979	148.209	0.933
RUN#2 QA_0018.LAB	4/4/2014	12:41:41 PM	0.267	0.041	0.007	129.788	5.023	6.496	0.071	-0.542	14.798	58.154		28.638	148.107	0.937
RUN#2 QA_0019.LAB	4/4/2014	12:42:39 PM	0.228	0.044	0.009	122.894	5.067	5.799	0.210	-0.466	15.481	61.267		26.535	148.209	0.931
RUN#2 QA_0020.LAB	4/4/2014	12:43:37 PM	0.127	0.042	0.011	133.420	5.193	6.224	0.156	-0.532	15.324	61.769		29.932	148.209	0.928
RUN#2 QA_0021.LAB	4/4/2014	12:44:35 PM	0.053	0.057	0.004	145.046	5.257	7.320	0.136	-0.565	14.334	58.978		32.459	148.311	0.928
RUN#2 QA_0022.LAB	4/4/2014	12:45:34 PM	0.012	0.051	0.007	147.512	5.212	6.156	0.216	-0.553	14.028	51.934		33.634	148.107	0.930
RUN#2 QA_0023.LAB	4/4/2014	12:46:32 PM	0.008	0.049	0.007	144.665	5.009	6.459	0.213	-0.517	14.845	61.950		33.155	148.209	0.926
Run #2 Post Test CTS																
RUN#2 CTS_0001.LAB	4/4/2014	12:51:10 PM	0.001	0.004	-0.001	13.306	0.000	-0.052	0.010	0.003	-0.049	17.281		0.006	148.107	1.039
RUN#2 CTS_0002.LAB	4/4/2014	12:52:08 PM	0.008	0.004	-0.001	13.522	0.000	-0.156	-0.016	0.015	-0.050	17.834		0.008	148.514	1.003
RUN#2 CTS_0003.LAB	4/4/2014	12:53:06 PM	0.004	0.007	0.002	13.307	0.000	-0.195	-0.039	0.012	-0.042	17.185		0.008	148.311	1.003
Run #3																
RUN#3_0001.LAB	4/4/2014	1:02:47 PM	0.001	0.042	0.010	141.442	5.058	6.233	0.104	-0.209	15.095	57.110	3.552	32.857	148.107	0.928
RUN#3_0002.LAB	4/4/2014	1:05:37 PM	-0.005	0.042	0.014	133.393	4.981	6.365	0.108	-0.209	14.452	58.083	3.846	31.234	148.107	0.936
RUN#3_0003.LAB	4/4/2014	1:08:01 PM	0.113	0.039	0.012	127.027	4.960	6.566	0.066	-0.177	15.445	62.341	5.671	25.272	148.311	0.939
RUN#3_0004.LAB	4/4/2014	1:10:39 PM	-0.006	0.045	0.015	148.908	5.186	7.012	0.100	-0.218	15.529	58.947	7.714	30.159	148.413	0.927
RUN#3_0005.LAB	4/4/2014	1:13:29 PM	-0.023	0.042	0.011	132.791	5.003	6.419	0.074	-0.212	14.860	56.847	-0.360	31.054	148.311	0.938
RUN#3_0006.LAB	4/4/2014	1:15:53 PM	0.072	0.040	0.015	130.305	5.083	5.965	0.071	-0.202	15.326	60.453	6.350	26.998	148.209	0.932
RUN#3_0007.LAB	4/4/2014	1:18:57 PM	-0.011	0.048	0.015	150.169	5.146	6.463	0.036	-0.214	15.035	58.414	4.972	32.067	148.311	0.929
RUN#3_0008.LAB	4/4/2014	1:21:47 PM	-0.008	0.043	0.017	132.118	4.914	6.208	0.121	-0.206	15.159	60.402	6.407	29.619	148.209	0.935
RUN#3_0009.LAB	4/4/2014	1:24:18 PM	0.080	0.043	0.014	131.243	5.215	6.300	-0.009	-0.203	15.596	60.826	6.339	26.584	148.107	0.928
RUN#3_0010.LAB	4/4/2014	1:27:55 PM	-0.029	0.046	0.010	138.425	5.094	6.352	0.036	-0.187	15.424	59.614	4.088	32.018	148.311	0.932
RUN#3_0011.LAB	4/4/2014	1:30:32 PM	0.066	0.041	0.013	121.426	5.000	6.035	0.079	-0.190	15.467	58.548	5.164	26.796	148.209	0.934
RUN#3_0012.LAB	4/4/2014	1:32:56 PM	-0.002	0.048	0.014	135.454	5.212	6.423	0.031	-0.214	16.022	62.121	7.822	30.047	148.107	0.926
RUN#3_0013.LAB	4/4/2014	1:35:53 PM	-0.002	0.043	0.010	137.334	5.093	6.130	-0.001	-0.200	15.021	56.716	-0.491	31.139	148.413	0.935
RUN#3_0015.LAB	4/4/2014	1:40:55 PM	-0.052	0.047	0.013	136.770	5.148	5.901	0.094	-0.226	15.813	57.712	3.200	32.721	148.311	0.924
RUN#3_0016.LAB	4/4/2014	1:43:19 PM	-0.028	0.045	0.014	138.800	5.112	6.658	0.019	-0.179	14.391	53.633	3.540	29.055	148.311	0.938
RUN#3_0017.LAB	4/4/2014	1:47:47 PM	-0.055	0.046	0.014	137.459	5.129	6.382	0.016	-0.212	15.023	58.629	5.137	31.938	148.107	0.934
RUN#3_0018.LAB	4/4/2014	1:50:11 PM	0.024	0.038	0.010	130.051	5.020	6.371	0.032	-0.176	14.834	61.819	8.039	27.905	148.107	0.933
RUN#3_0019.LAB	4/4/2014	1:52:42 PM	0.030	0.043	0.012	123.251	5.026	6.112	-0.007	-0.187	15.329	66.720	4.843	27.400	148.311	0.935
RUN#3_0020.LAB	4/4/2014	1:55:26 PM	-0.032	0.047	0.013	130.764	4.958	6.161	0.021	-0.202	14.603	62.963	6.351	30.395	148.311	0.937
RUN#3_0021.LAB	4/4/2014	1:57:50 PM	0.059	0.043	0.016	123.786	4.924	6.131	0.073	-0.182	15.061	63.397	6.100	25.317	148.311	0.940
RUN#3_0022.LAB	4/4/2014	2:00:21 PM	-0.014	0.045	0.014	131.374	5.037	6.330	-0.064	-0.198	14.958	63.313	7.140	29.844	148.107	0.929
RUN#3_0023.LAB	4/4/2014	2:03:11 PM	-0.066	0.048	0.013	147.421	5.013	6.573	-0.062	-0.219	14.207	56.353	3.847	31.853	148.311	0.937
RUN#3_0024.LAB	4/4/2014	2:05:49 PM	0.033	0.047	0.010	134.198	5.067	6.502	0.027	-0.211	15.196	56.893	5.624	27.041	148.209	0.934
Run #3 Post Test Spike																
RUN#3 QA_0001.LAB	4/4/2014	2:08:49 PM	-0.031	-0.001	0.016	144.155	5.172	6.361	-0.170	-0.557	13.738	60.816		32.443	148.311	0.923
RUN#3 QA_0002.LAB	4/4/2014	2:09:47 PM	0.049	0.008	0.016	156.690	5.390	6.512	-0.106	-0.503	13.717	53.147		33.569	148.718	0.931
RUN#3 QA_0003.LAB	4/4/2014	2:10:44 PM	0.134	0.006	0.014	163.548	5.154	6.063	-0.004	-0.506	13.299	51.240		33.783	149.125	0.927
RUN#3 QA_0004.LAB	4/4/2014	2:11:41 PM	0.073	-0.001	0.013	126.267	4.724	6.392	-0.174	-0.515	15.558	60.938		27.619	148.413	0.933
RUN#3 QA_0005.LAB	4/4/2014	2:12:38 PM	0.105	0.000	0.017	118.865	4.836	6.427	-0.074	-0.476	15.512	65.697		25.212	148.311	0.935
RUN#3 QA_0006.LAB	4/4/2014	2:13:35 PM	0.093	0.000	0.013	135.534	5.203	6.385	-0.084	-0.471	14.766	58.050		24.637	148.209	0.932
RUN#3 QA_0007.LAB	4/4/2014	2:14:32 PM	0.070	0.002	0.009	128.455	4.931	6.520	-0.148	-0.525	16.886	68.109		28.268	148.311	0.930
RUN#3 QA_0008.LAB	4/4/2014	2:15:29 PM	0.173	0.499	0.017	125.115	4.655	6.442	-0.193	-0.495	14.044	60.906		28.776	148.209	0.933
RUN#3 QA_0009.LAB	4/4/2014	2:16:26 PM	0.500	0.635	0.015	174.913	4.923	6.473	-0.254	-0.522	13.485	46.601		29.021	148.107	0.932
RUN#3 QA_0010.LAB	4/4/2014	2:17:24 PM	0.679	0.628	0.011	124.580	4.621	5.890	-0.272	-0.498	14.074	52.518		29.173	148.107	0.928
RUN#3 QA_0011.LAB	4/4/2014	2:18:21 PM	0.753	0.636	0.013	105.730	4.264	5.224	-0.166	-0.439	14.682	64.680		28.699	148.209	0.934
RUN#3 QA_0012.LAB	4/4/2014	2:19:18 PM	0.952	0.667	0.016	111.516	4.461	5.128	-0.147	-0.476	13.460	61.677		25.471	148.209	0.935
RUN#3 QA_0013.LAB	4/4/2014	2:20:15 PM	1.065	0.670	0.012	120.010	4.694	5.989	-0.322	-0.461	13.688	50.968		23.515	148.311	0.938
RUN#3 QA_0014.LAB	4/4/2014	2:21:12 PM	1.130	0.670	0.005	113.125	4.490	5.771	-0.327	-0.460	13.493	61.557		24.225	148.311	0.933
RUN#3 QA_0015.LAB	4/4/2014	2:22:09 PM	1.032	0.638	0.014	112.291	4.537	5.013	-0.302	-0.508	14.282	62.756		27.963	148.209	0.937
RUN#3 QA_0016.LAB	4/4/2014	2:23:06 PM	0.975	0.629	0.014	125.335	4.643	5.663	-0.448	-0.501	13.966	58.001		29.067	148.209	0.930
RUN#3 QA_0017.LAB	4/4/2014	2:24:04 PM	0.980	0.629	0.018	149.784	4.822	6.268	-0.257	-0.500	13.402	49.303		29.761	148.107	0.929
RUN#3 QA_0018.LAB	4/4/2014	2:25:01 PM	0.978	0.626	0.015	111.287	4.236	5.633	-0.127	-0.455	14.759	62.041		29.015	148.209	0.932
RUN#3 QA_0019.LAB	4/4/2014	2:25:58 PM	0.603	0.072	0.009	118.692	4.600	5.718	-0.025	-0.511	14.899	72.899		30.748	148.209	0.930
RUN#3 QA_0020.LAB	4/4/2014	2:26:55 PM	0.358	0.003	0.010	121.082	4.769	5.793	-0.180	-0.458	14.102	69.937		27.475	148.311	0.936
RUN#3 QA_0021.LAB	4/4/2014	2:27:52 PM	0.305	0.001	0.008	119.714	4.823	6.100	-0.005	-0.492	14.299	66.791		25.227	148.311	0.934
RUN#3 QA_0022.LAB	4/4/2014	2:28:49 PM	0.281	0.001	0.012	118.641	4.746	6.043	-0.153	-0.491	15.169	67.322		23.896	148.514	0.934
RUN#3 QA_0023.LAB	4/4/2014	2:29:46 PM	0.192	0.003	0.011	122.343	4.967	4.998	0.091	-0.532	16.113	71.100		27.836	148.209	0.933
RUN#3 QA_0024.LAB	4/4/2014	2:30:44 PM	0.127	-0.002	0.010	118.715	4.792	5.396	-0.182	-0.536	15.187	69.580		29.972	148.311	0.930
RUN#3 QA_0025.LAB	4/4/2014	2:31:41 PM	0.101	-0.001	0.017	145.648	5.175	6.795	-0.098	-0.557	14.657	61.822		31.426	148.311	0.926
Run #3 Post Test CTS																
RUN#3 CTS_0001.LAB	4/4/2014	2:38:35 PM	0.016	0.006	0.006	13.524	0.000	-0.207	0.013	0.020	-0.035	17.187		0.001	149.023	1.000
RUN#3 CTS_0002.LAB	4/4/2014	2:39:04 PM	0.004	0.005	0.008	13.420	0.000	-0.239	-0.015	0.018	-0.035	17.096		-0.005	149.125	1.000
RUN#3 CTS_0003.LAB	4/4/2014	2:39:33 PM	-0.003	0.006	0.005	13.446	0.000	-0.297	-0.005	-0.015	-0.035	17.043		0.005	149.023	0.999
RUN#3 CTS_0004.LAB	4/4/2014	2:40:08 PM	0.012	0.005	0.006	13.514	0.000	-0.018	0.017	0.017	-0.042	17.007		0.002	149.023	0.999
RUN#3 CTS_0005.LAB	4/4/2014	2:40:31 PM	0.002	0.005	0.007	13.499	0.001	-0.207	-0.030	0.024	-0.036	17.163		-0.004	149.125	0.999
RUN#3 CTS_0006.LAB	4/4/2014	2:41:00 PM	0.014	0.006	0.006	13.482	0.000	-0.166	-0.002	0.018	-0.040	17.038		0.002	149.125	0.999
Run #4																
RUN#4_0002.LAB	4/4/2014	2:57:43 PM	0.0908	0.0391	0.0141	118.7788	4.9601	6.0568	-0.0258	-0.2005	15.5340	61.6278	4.9098	25.7009	148.1075	0.9330
RUN#4_0003.LAB	4/4/2014	3:01:06 PM	-0.0220	0.0415	0.0108	138.4728	5.1512	6.5961	0.0519	-0.2306	14.4309	60.4084	-1.0525	31.1314	147.9039	0.9278
RUN#4_0004.LAB	4/4/2014	3:04:03 PM	0.0009	0.0386	0.0130	127.9347	4.9274	6.3113	0.1453	-0.1916	14.1136	58.8508	3.3085	29.3094	148.0057	0.9404
RUN#4_0005.LAB	4/4/2014	3:06:27 PM	0.0898	0.0364	0.0101	130.1600	5.2305	6.3249	0.0842	-0.2047	14.9590	61.5482	4.8971	25.5859	148.1075	0.9304
RUN#4_0006.LAB	4/4/2014	3:08:58 PM	-0.0407	0.0447	0.0120	133.9861	5.1092	6.6070	0.0670	-0.2278	14.3420	60.5267	-0.9403	31.1104	148.2092	0.9304
RUN#4_0007.LAB	4/4/2014	3:11:35 PM	-0.0044	0.0413	0.0119	138.9877	5.1891	6.5179	-0.0236	-0.1904	13.3573	58.5578	5.7978	29.9756	148.3110	0.9291
RUN#4_0008.LAB	4/4/2014	3:14:00 PM	0.0561	0.0375	0.0108	123.4445	5.0577	7.0643	0.0625	-0.1983	14.9621	62.6328	4.4512	25.7744	148.3110	0.9268
RUN#4_0009.LAB	4/4/2014	3:16:43 PM	-0.0319	0.0492	0.0124	146.7073	5.2437	6.9673	-0.0287	-0.2120	14.1376	58.7396	7.0942	30.8569	148.1075	0.9271
RUN#4_0010.LAB	4/4/2014	3:19:27 PM	-0.0343	0.0397	0.0072	143.3518	5.0724	6.9809	-0.1168	-0.2002	14.2573	58.4635	6.4433	30.1888	148.2092	0.9284
RUN#4_0011.LAB	4/4/2014	3:22:11 PM	-0.0133	0.0359	0.0078	126.8171	4.9544	6.6361	0.0095	-0.2055	14.8278	65.6086	7.0945	28.7080	148.1075	0.9294
RUN#4_0012.LAB	4/4/2014	3:24:49 PM	-0.0574	0.0457	0.0079	138.4318	4.9775	6.7706	-0.0475	-0.1858	13.6889	67.2750	3.4377	31.2784	148.0057	0.9242
RUN#4_0013.LAB	4/4/2014	3:27:13 PM	0.0321	0.0418	0.0098	123.9263	4.8766	6.6457	-0.1005	-0.1782	14.2724	65.1820	4.4453	26.1090	148.2092	0.9314
RUN#4_0014.LAB	4/4/2014	3:29:50 PM	0.0015	0.0416	0.0082	133.7841	5.0563	6.7464	-0.0509	-0.1925	14.8130	68.7537	6.2931	28.3016	148.1075	0.9262

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
RUN#4_0015.LAB	4/4/2014	3:34:11 PM	0.0225	0.0394	0.0084	128.8173	4.8829	6.4472	-0.0611	-0.1792	13.7076	63.6118	5.1464	26.5383	148.2092	0.9365
RUN#4_0016.LAB	4/4/2014	3:37:02 PM	0.0221	0.0399	0.0095	131.3690	4.9096	6.4857	-0.0108	-0.1783	14.9561	65.3776	5.4187	25.5597	148.1075	0.9339
RUN#4_0017.LAB	4/4/2014	3:41:11 PM	-0.0593	0.0379	0.0035	145.6029	4.9229	6.8682	-0.0660	-0.2267	14.3011	62.2882	5.0004	30.6302	148.1075	0.9249
RUN#4_0018.LAB	4/4/2014	3:45:45 PM	0.0110	0.0360	0.0114	125.3831	4.8520	6.5839	-0.0143	-0.1623	15.1372	66.8658	5.2620	26.2686	148.0057	0.9284
RUN#4_0019.LAB	4/4/2014	3:49:48 PM	-0.0694	0.0401	0.0113	127.8951	4.8139	6.7083	0.0965	-0.1975	14.1707	62.1854	8.5310	28.9799	148.2092	0.9343
RUN#4_0020.LAB	4/4/2014	3:57:22 PM	-0.0061	0.0365	0.0063	125.6897	4.7463	6.8903	-0.1328	-0.1878	14.6839	64.0974	5.3093	26.2549	148.3110	0.9411
RUN#4_0021.LAB	4/4/2014	4:01:25 PM	-0.0262	0.0392	0.0146	123.6633	4.8241	6.9660	-0.0352	-0.2068	15.2230	67.2238	5.0160	26.9541	148.2092	0.9281
Run #4 Post Test Spike																
RUN#4 QA_0002.LAB	4/4/2014	4:09:54 PM	-0.116	0.039	0.017	130.851	4.582	6.783	-0.047	-0.507	15.393	66.821		30.939	148.311	0.926
RUN#4 QA_0003.LAB	4/4/2014	4:10:51 PM	-0.135	0.039	0.007	147.925	5.050	6.500	0.021	-0.498	15.030	60.355		31.350	148.209	0.927
RUN#4 QA_0004.LAB	4/4/2014	4:11:48 PM	-0.086	0.041	0.011	134.473	4.732	7.071	-0.091	-0.511	15.570	60.454		28.602	148.107	0.932
RUN#4 QA_0005.LAB	4/4/2014	4:12:45 PM	-0.035	0.038	0.014	122.722	4.774	6.352	-0.085	-0.469	16.403	65.238		25.696	148.209	0.933
RUN#4 QA_0006.LAB	4/4/2014	4:13:42 PM	-0.018	0.039	0.008	161.130	5.049	7.147	-0.223	-0.495	15.996	51.848		24.079	148.209	0.933
RUN#4 QA_0007.LAB	4/4/2014	4:14:39 PM	0.086	0.631	0.005	123.437	4.631	6.579	-0.149	-0.463	14.684	60.772		23.140	148.209	0.934
RUN#4 QA_0008.LAB	4/4/2014	4:15:37 PM	0.351	0.708	0.010	118.443	4.404	5.998	-0.327	-0.466	15.745	59.116		27.238	148.107	0.929
RUN#4 QA_0009.LAB	4/4/2014	4:16:34 PM	0.473	0.689	0.014	128.791	4.611	6.132	-0.213	-0.463	14.311	57.778		28.272	148.209	0.930
RUN#4 QA_0010.LAB	4/4/2014	4:17:31 PM	0.526	0.657	0.014	114.299	4.124	5.710	-0.301	-0.453	14.533	66.582		28.438	148.209	0.937
RUN#4 QA_0011.LAB	4/4/2014	4:18:28 PM	0.590	0.666	0.015	138.353	4.697	6.295	-0.122	-0.485	13.444	52.616		29.035	148.209	0.929
RUN#4 QA_0012.LAB	4/4/2014	4:19:25 PM	0.708	0.680	0.001	128.814	4.517	5.850	-0.256	-0.473	13.834	52.561		27.327	148.311	0.933
RUN#4 QA_0013.LAB	4/4/2014	4:20:22 PM	0.870	0.692	0.016	116.862	4.408	5.957	-0.365	-0.429	14.975	56.716		23.656	148.107	0.936
RUN#4 QA_0014.LAB	4/4/2014	4:21:19 PM	0.964	0.706	0.014	108.676	4.268	6.191	-0.181	-0.436	14.845	60.113		21.873	148.311	0.938
RUN#4 QA_0015.LAB	4/4/2014	4:22:17 PM	0.967	0.693	0.001	123.833	4.624	5.772	-0.243	-0.512	14.822	61.351		24.940	148.209	0.936
RUN#4 QA_0016.LAB	4/4/2014	4:23:14 PM	0.875	0.680	0.011	127.076	4.529	5.805	-0.164	-0.473	13.789	55.546		28.184	148.107	0.938
RUN#4 QA_0017.LAB	4/4/2014	4:24:11 PM	0.847	0.689	0.008	130.605	4.544	6.316	-0.185	-0.492	14.958	55.968		28.632	148.311	0.927
RUN#4 QA_0018.LAB	4/4/2014	4:25:08 PM	0.853	0.678	0.017	130.704	4.649	6.207	-0.215	-0.482	14.023	53.049		29.120	148.209	0.928
RUN#4 QA_0019.LAB	4/4/2014	4:26:05 PM	0.838	0.653	0.011	122.588	4.396	5.612	-0.199	-0.504	14.811	57.573		29.388	148.107	0.934
RUN#4 QA_0020.LAB	4/4/2014	4:27:02 PM	0.868	0.672	0.010	125.257	4.477	5.604	-0.225	-0.481	14.293	57.596		28.772	148.107	0.933
RUN#4 QA_0021.LAB	4/4/2014	4:27:59 PM	0.979	0.684	0.007	106.567	4.172	5.707	-0.283	-0.422	14.759	63.895		25.720	148.311	0.938
RUN#4 QA_0022.LAB	4/4/2014	4:28:57 PM	1.103	0.706	0.007	129.268	4.705	5.658	-0.055	-0.446	13.870	55.280		23.207	148.311	0.936
RUN#4 QA_0023.LAB	4/4/2014	4:29:54 PM	1.173	0.713	0.007	114.946	4.579	6.330	-0.287	-0.437	14.695	54.105		22.079	148.209	0.937
RUN#4 QA_0024.LAB	4/4/2014	4:30:51 PM	1.128	0.699	0.008	132.274	4.879	5.931	-0.254	-0.479	14.476	53.435		25.966	148.209	0.931
RUN#4 QA_0025.LAB	4/4/2014	4:31:48 PM	0.552	0.112	0.010	122.289	4.807	6.294	-0.153	-0.505	16.029	61.621		30.110	147.904	0.931
RUN#4 QA_0026.LAB	4/4/2014	4:32:45 PM	0.182	0.036	0.007	138.372	5.078	6.384	-0.174	-0.558	15.126	57.334		31.609	148.209	0.927
RUN#4 QA_0027.LAB	4/4/2014	4:33:42 PM	0.060	0.029	0.008	129.777	4.849	6.161	0.045	-0.537	15.649	64.184		31.838	148.107	0.931
RUN#4 QA_0028.LAB	4/4/2014	4:34:39 PM	0.028	0.051	0.004	140.846	4.998	6.273	0.035	-0.544	14.289	58.864		31.448	148.006	0.934
RUN#4 QA_0029.LAB	4/4/2014	4:35:36 PM	0.009	0.049	0.006	126.806	4.850	6.065	-0.060	-0.527	15.373	61.603		30.965	148.311	0.932
RUN#4 QA_0030.LAB	4/4/2014	4:36:34 PM	0.055	0.030	0.018	115.554	4.760	5.569	-0.127	-0.501	15.567	65.649		27.139	148.209	0.932
RUN#4 QA_0031.LAB	4/4/2014	4:37:31 PM	0.067	0.041	0.014	131.373	5.189	6.418	-0.047	-0.511	15.084	57.912		24.871	148.311	0.932
Run #5																
RUN#5_0001.LAB	4/4/2014	4:42:38 PM	-0.054	0.043	0.006	135.009	5.088	6.662	0.059	-0.203	14.720	58.775	2.867	31.833	148.107	0.925
RUN#5_0002.LAB	4/4/2014	4:45:32 PM	0.027	0.038	0.006	122.398	4.814	6.422	-0.030	-0.205	14.972	63.665	6.705	27.334	148.311	0.936
RUN#5_0003.LAB	4/4/2014	4:49:12 PM	-0.016	0.040	0.009	134.323	5.120	7.148	-0.122	-0.197	15.644	61.960	6.597	28.754	148.107	0.922
RUN#5_0004.LAB	4/4/2014	4:50:57 PM	-0.006	0.035	0.011	147.935	5.110	7.272	-0.154	-0.192	14.016	60.186	7.732	28.070	148.209	0.932
RUN#5_0005.LAB	4/4/2014	4:51:55 PM	0.047	0.041	0.013	126.060	4.840	6.874	0.027	-0.152	15.038	63.665	6.019	25.368	148.413	0.934
RUN#5_0006.LAB	4/4/2014	4:52:53 PM	0.089	0.033	0.006	109.560	4.602	6.264	0.002	-0.183	15.888	74.306	5.217	23.253	148.311	0.935
RUN#5_0007.LAB	4/4/2014	4:53:51 PM	0.054	0.041	0.010	148.300	5.361	6.611	-0.101	-0.188	14.759	60.881	5.376	23.604	148.413	0.931
RUN#5_0008.LAB	4/4/2014	4:56:46 PM	-0.068	0.037	0.009	131.897	4.872	6.994	0.015	-0.213	15.130	60.704	7.593	29.082	148.107	0.928
RUN#5_0009.LAB	4/4/2014	4:59:11 PM	0.043	0.035	0.008	118.786	4.705	6.616	-0.098	-0.188	15.580	65.318	4.875	24.719	148.311	0.931
RUN#5_0010.LAB	4/4/2014	5:00:09 PM	0.048	0.038	0.010	127.939	4.845	6.996	-0.145	-0.155	14.875	65.176	5.213	23.987	148.311	0.934
RUN#5_0011.LAB	4/4/2014	5:02:05 PM	-0.085	0.040	0.006	135.012	4.920	7.296	-0.116	-0.194	15.337	66.471	7.842	29.100	148.616	0.929
RUN#5_0012.LAB	4/4/2014	5:03:03 PM	-0.057	0.043	0.010	147.422	4.832	7.133	-0.047	-0.185	15.371	58.643	3.643	31.556	148.413	0.926
RUN#5_0013.LAB	4/4/2014	5:04:01 PM	-0.082	0.043	0.000	136.686	4.780	6.222	0.128	-0.194	14.999	66.563	3.943	31.572	148.514	0.930
RUN#5_0014.LAB	4/4/2014	5:04:59 PM	-0.072	0.037	0.009	130.998	4.693	6.075	0.022	-0.217	15.131	66.366	-1.323	31.099	148.514	0.931
RUN#5_0015.LAB	4/4/2014	5:06:26 PM	-0.034	0.042	0.013	121.518	4.759	6.158	0.151	-0.198	15.108	62.936	6.360	27.045	148.514	0.943
RUN#5_0016.LAB	4/4/2014	5:07:24 PM	0.034	0.032	0.010	111.350	4.519	6.384	0.086	-0.174	15.700	71.797	4.822	23.490	148.718	0.939
RUN#5_0017.LAB	4/4/2014	5:08:23 PM	0.067	0.033	0.014	110.708	4.539	5.556	0.015	-0.160	16.649	80.474	5.313	22.723	148.311	0.935
RUN#5_0018.LAB	4/4/2014	5:13:47 PM	0.038	0.032	0.015	108.648	4.469	5.923	-0.118	-0.184	16.870	71.502	5.225	25.044	148.311	0.939
RUN#5_0019.LAB	4/4/2014	5:14:45 PM	0.034	0.032	0.006	126.071	4.792	6.791	-0.077	-0.183	15.469	64.460	6.133	23.222	148.514	0.938
RUN#5_0020.LAB	4/4/2014	5:17:11 PM	0.006	0.039	0.010	123.789	4.723	5.978	0.055	-0.177	16.548	70.544	7.998	27.560	148.209	0.930
RUN#5_0021.LAB	4/4/2014	5:18:38 PM	-0.083	0.037	0.005	123.722	4.512	6.068	-0.101	-0.219	16.018	70.532	-2.354	30.921	148.311	0.929
RUN#5_0022.LAB	4/4/2014	5:20:34 PM	-0.077	0.041	0.009	129.016	4.865	6.159	-0.061	-0.173	15.105	60.498	8.380	27.824	148.921	0.939
RUN#5_0023.LAB	4/4/2014	5:21:32 PM	0.069	0.034	0.013	118.006	4.814	6.306	-0.100	-0.162	15.674	64.707	5.401	24.549	149.328	0.940
RUN#5_0024.LAB	4/4/2014	5:22:30 PM	0.025	0.040	0.010	121.066	4.787	6.556	-0.051	-0.177	17.039	67.886	5.529	23.781	148.616	0.935
RUN#5_0025.LAB	4/4/2014	5:25:24 PM	-0.082	0.037	0.008	128.076	4.738	6.661	-0.002	-0.192	16.640	65.922	7.547	28.896	148.413	0.925
RUN#5_0026.LAB	4/4/2014	5:26:22 PM	-0.075	0.043	0.003	130.299	4.796	6.370	0.065	-0.211	16.099	65.447	5.881	30.558	148.311	0.930
RUN#5_0027.LAB	4/4/2014	5:27:49 PM	-0.065	0.039	0.010	132.685	4.852	7.640	-0.055	-0.180	15.845	57.248	7.543	28.395	148.514	0.932
RUN#5_0028.LAB	4/4/2014	5:28:48 PM	0.075	0.026	0.009	116.936	4.517	5.703	-0.118	-0.130	15.253	61.015	4.821	23.885	149.125	0.997
RUN#5_0029.LAB	4/4/2014	5:29:46 PM	0.073	0.037	0.010	122.410	4.929	6.234	0.050	-0.175	17.051	68.730	5.735	25.690	148.820	0.934
RUN#5_0030.LAB	4/4/2014	5:30:44 PM	-0.065	0.039	0.008	137.558	5.120	7.639	-0.076	-0.206	16.214	64.823	6.981	28.520	148.311	0.928
RUN#5_0031.LAB	4/4/2014	5:31:42 PM	-0.054	0.036	0.008	128.876	4.807	6.634	-0.303	-0.190	16.494	64.940	5.755	30.009	148.413	0.927

PCS Phosphates
Raw FTIR Data

Spectrum	Date	Time	HF (ppm)	SF6 (ppm)	SiF4 (ppm)	CO (ppm)	CO2 (%)	CH4 (ppm)	NH3 (ppm)	HCl (ppm)	N2O (ppm)	NO (ppm)	NO2 (ppm)	H2O (%)	Temp (° C)	Pressure (atm)
RUN#5_0032.LAB	4/4/2014	5:32:40 PM	-0.062	0.035	0.012	138.636	5.025	6.303	-0.086	-0.190	16.060	61.118	6.014	30.028	148.311	0.928
RUN#5_0033.LAB	4/4/2014	5:33:38 PM	-0.076	0.039	0.008	126.611	4.780	6.253	0.026	-0.177	17.027	64.264	7.224	30.487	148.413	0.933
RUN#5_0034.LAB	4/4/2014	5:34:36 PM	-0.045	0.036	0.012	131.145	5.012	7.229	-0.011	-0.212	15.140	56.979	5.092	28.254	148.514	0.934
RUN#5_0035.LAB	4/4/2014	5:35:34 PM	0.001	0.038	0.007	167.164	5.307	7.578	-0.143	-0.165	16.353	50.647	6.871	25.973	148.616	0.932
RUN#5_0036.LAB	4/4/2014	5:36:32 PM	0.025	0.034	0.013	118.645	4.590	7.075	0.033	-0.166	17.487	62.220	5.001	24.631	148.820	0.936
RUN#5_0037.LAB	4/4/2014	5:37:30 PM	-0.077	0.046	0.010	158.568	5.410	7.407	-0.145	-0.199	15.946	53.915	5.758	29.009	148.820	0.927
RUN#5_0038.LAB	4/4/2014	5:38:28 PM	-0.070	0.042	0.002	136.913	4.875	6.999	-0.284	-0.180	15.942	58.026	-0.456	31.024	148.718	0.928
RUN#5_0039.LAB	4/4/2014	5:39:26 PM	-0.070	0.043	0.012	134.605	4.865	6.424	-0.056	-0.189	15.184	61.157	-0.498	31.145	148.311	0.927
Run #5 Post Test Spike																
RUN#5 QA_0001.LAB	4/4/2014	5:42:11 PM	-0.032	0.046	0.010	119.705	4.884	6.529	-0.129	-0.470	15.511	58.995		26.164	148.514	0.932
RUN#5 QA_0002.LAB	4/4/2014	5:43:09 PM	0.151	0.605	0.010	101.195	4.280	6.287	-0.171	-0.455	15.432	62.403		22.160	148.718	0.936
RUN#5 QA_0003.LAB	4/4/2014	5:44:07 PM	0.582	0.703	0.007	128.618	4.962	6.416	-0.262	-0.486	14.317	53.745		23.748	148.718	0.930
RUN#5 QA_0004.LAB	4/4/2014	5:45:05 PM	0.639	0.679	0.007	127.661	4.836	6.269	-0.340	-0.472	14.656	51.957		28.053	148.820	0.926
RUN#5 QA_0005.LAB	4/4/2014	5:46:03 PM	0.661	0.669	0.013	112.073	4.429	5.623	-0.160	-0.447	15.088	58.023		28.532	148.820	0.929
RUN#5 QA_0006.LAB	4/4/2014	5:47:01 PM	0.702	0.659	0.009	121.069	4.619	5.960	-0.212	-0.463	13.562	59.849		28.488	148.514	0.927
RUN#5 QA_0007.LAB	4/4/2014	5:47:59 PM	0.733	0.664	0.012	122.555	4.624	5.863	-0.164	-0.455	14.690	55.508		28.493	148.718	0.928
RUN#5 QA_0008.LAB	4/4/2014	5:48:57 PM	0.835	0.666	0.015	114.787	4.451	5.296	-0.181	-0.434	14.494	57.161		27.761	148.820	0.930
RUN#5 QA_0009.LAB	4/4/2014	5:49:55 PM	0.961	0.680	0.010	111.569	4.535	5.609	-0.294	-0.451	14.209	56.902		24.115	148.820	0.936
RUN#5 QA_0010.LAB	4/4/2014	5:50:53 PM	1.066	0.700	0.004	115.914	4.578	5.791	-0.291	-0.421	14.299	53.268		22.160	149.023	0.938
RUN#5 QA_0011.LAB	4/4/2014	5:51:51 PM	1.132	0.714	0.005	106.137	4.415	6.056	-0.164	-0.449	14.716	56.670		21.141	148.921	0.936
RUN#5 QA_0012.LAB	4/4/2014	5:52:50 PM	1.132	0.690	0.011	136.029	4.869	5.853	-0.405	-0.321	14.907	55.073		24.872	148.820	0.932
RUN#5 QA_0013.LAB	4/4/2014	5:53:48 PM	0.982	0.673	0.003	129.098	4.733	5.758	-0.347	-0.470	14.290	51.990		28.448	148.718	0.928
RUN#5 QA_0014.LAB	4/4/2014	5:54:46 PM	0.952	0.652	0.006	114.229	4.313	5.483	-0.398	-0.457	14.703	61.882		28.613	148.616	0.927
RUN#5 QA_0015.LAB	4/4/2014	5:55:44 PM	0.942	0.655	0.009	127.423	4.688	5.747	-0.078	-0.470	13.345	54.968		29.318	148.718	0.926
RUN#5 QA_0016.LAB	4/4/2014	5:56:42 PM	0.957	0.649	0.007	121.320	4.489	5.813	-0.275	-0.502	13.977	55.495		28.906	148.718	0.931
RUN#5 QA_0017.LAB	4/4/2014	5:57:40 PM	1.052	0.680	0.012	106.104	4.326	5.422	-0.048	-0.423	13.993	60.895		25.510	148.718	0.935
RUN#5 QA_0018.LAB	4/4/2014	5:58:38 PM	0.644	0.098	0.008	120.580	4.877	6.811	-0.024	-0.491	14.251	58.958		24.587	148.921	0.936
RUN#5 QA_0019.LAB	4/4/2014	5:59:36 PM	0.286	0.043	0.015	117.948	4.800	6.077	0.016	-0.429	16.068	65.245		23.199	148.921	0.934
RUN#5 QA_0020.LAB	4/4/2014	6:00:34 PM	0.175	0.038	0.006	146.084	5.310	7.168	-0.156	-0.477	15.417	61.319		26.952	148.820	0.929
RUN#5 QA_0021.LAB	4/4/2014	6:01:32 PM	0.087	0.044	0.017	125.359	4.706	6.660	0.060	-0.511	16.474	63.959		29.564	148.921	0.933
RUN#5 QA_0022.LAB	4/4/2014	6:02:30 PM	-0.009	0.044	-0.001	147.969	5.170	6.532	-0.070	-0.505	15.285	59.217		30.843	148.820	0.923
RUN#5 QA_0023.LAB	4/4/2014	6:03:28 PM	-0.039	0.046	0.008	129.590	4.963	6.934	-0.031	-0.512	14.587	58.066		31.742	148.718	0.925
RUN#5 QA_0024.LAB	4/4/2014	6:04:26 PM	-0.061	0.040	0.012	148.330	4.991	6.708	0.025	-0.514	15.667	59.790		31.565	148.718	0.922
RUN#5 QA_0025.LAB	4/4/2014	6:05:54 PM	-0.052	0.044	0.007	126.610	4.803	6.907	0.028	-0.452	15.112	58.452		27.621	148.718	0.935
RUN#5 QA_0026.LAB	4/4/2014	6:06:52 PM	0.038	0.036	0.009	120.987	4.856	6.225	-0.115	-0.472	15.532	62.094		24.378	148.921	0.941
Run #6																
RUN#6_0002.LAB	4/4/2014	6:24:09 PM	-0.026	0.049	0.022	128.166	4.938	7.219	-0.049	-0.213	15.505	62.623	6.088	30.482	148.820	0.926
RUN#6_0003.LAB	4/4/2014	6:25:07 PM	-0.028	0.044	0.014	125.397	4.706	6.835	-0.080	-0.180	15.537	64.476	3.773	31.581	148.820	0.925
RUN#6_0004.LAB	4/4/2014	6:26:05 PM	-0.048	0.037	0.011	132.452	4.788	6.184	-0.132	-0.192	15.091	65.355	2.071	31.730	148.820	0.924
RUN#6_0005.LAB	4/4/2014	6:27:03 PM	-0.054	0.045	0.014	137.973	4.762	6.886	0.002	-0.147	15.757	60.158	2.885	31.326	148.820	0.929
RUN#6_0006.LAB	4/4/2014	6:28:01 PM	0.015	0.046	0.018	129.860	4.742	6.477	-0.126	-0.146	15.704	62.332	7.155	28.305	148.718	0.929
RUN#6_0007.LAB	4/4/2014	6:28:59 PM	0.041	0.042	0.016	128.743	4.883	6.450	-0.104	-0.155	15.332	59.485	4.673	25.712	148.820	0.934
RUN#6_0008.LAB	4/4/2014	6:29:57 PM	0.059	0.042	0.014	121.132	4.794	7.433	-0.261	-0.176	15.919	59.074	5.510	24.066	148.718	0.934
RUN#6_0009.LAB	4/4/2014	6:30:55 PM	0.049	0.040	0.020	117.450	4.682	6.192	-0.040	-0.158	17.397	70.021	5.084	25.822	148.718	0.930
RUN#6_0010.LAB	4/4/2014	6:33:20 PM	-0.038	0.044	0.007	141.211	4.947	7.045	-0.050	-0.174	15.380	59.536	4.624	30.531	148.718	0.926
RUN#6_0011.LAB	4/4/2014	6:34:18 PM	-0.047	0.043	0.011	140.548	5.020	7.218	-0.274	-0.159	15.453	56.785	3.048	31.094	148.718	0.927
RUN#6_0012.LAB	4/4/2014	6:35:16 PM	-0.055	0.046	0.013	130.121	4.883	6.696	-0.072	-0.163	15.837	60.861	6.824	29.689	148.514	0.928
RUN#6_0013.LAB	4/4/2014	6:36:14 PM	0.041	0.038	0.011	129.742	4.836	6.380	-0.101	-0.136	15.672	57.987	5.789	26.479	148.616	0.933
RUN#6_0014.LAB	4/4/2014	6:37:13 PM	0.047	0.033	0.019	118.515	4.595	6.702	-0.074	-0.140	16.020	71.129	4.518	24.051	148.718	0.933
RUN#6_0015.LAB	4/4/2014	6:38:11 PM	0.039	0.040	0.016	132.922	5.092	6.942	0.024	-0.161	16.490	61.350	5.435	25.565	148.718	0.929
RUN#6_0016.LAB	4/4/2014	6:39:38 PM	-0.037	0.041	0.013	125.180	4.745	6.650	-0.061	-0.186	16.319	64.418	6.200	30.554	148.514	0.929
RUN#6_0017.LAB	4/4/2014	6:40:36 PM	-0.064	0.043	0.011	126.162	4.869	6.330	-0.198	-0.154	15.056	63.069	4.740	31.413	148.514	0.925
RUN#6_0018.LAB	4/4/2014	6:41:34 PM	-0.058	0.044	0.009	128.765	4.703	7.131	-0.095	-0.168	15.615	64.089	3.556	31.214	148.616	0.926
RUN#6_0019.LAB	4/4/2014	6:42:32 PM	-0.061	0.042	0.010	128.923	4.742	6.729	-0.039	-0.141	16.214	65.536	4.958	30.441	148.616	0.929
RUN#6_0020.LAB	4/4/2014	6:43:59 PM	0.025	0.040	0.009	126.472	4.995	6.841	-0.072	-0.126	14.894	59.067	5.478	26.018	148.718	0.934
RUN#6_0021.LAB	4/4/2014	6:44:57 PM	0.056	0.036	0.009	121.039	4.819	7.156	-0.130	-0.174	16.280	62.352	4.691	24.159	148.820	0.932
RUN#6_0022.LAB	4/4/2014	6:45:55 PM	0.041	0.046	0.017	114.424	4.839	6.945	-0.022	-0.143	17.355	63.820	4.728	24.455	148.718	0.930
RUN#6_0023.LAB	4/4/2014	6:47:22 PM	-0.053	0.037	0.015	127.304	4.941	6.571	-0.059	-0.131	15.929	63.867	5.601	30.015	148.718	0.924
RUN#6_0024.LAB	4/4/2014	6:48:20 PM	-0.070	0.041	0.007	125.917	4.802	6.659	0.002	-0.184	15.033	63.262	0.567	31.313	148.718	0.922
RUN#6_0025.LAB	4/4/2014	6:49:18 PM	-0.053	0.043	0.004	131.399	4.893	6.583	-0.087	-0.162	15.194	58.066	2.506	31.553	148.718	0.924
RUN#6_0026.LAB	4/4/2014	6:50:17 PM	-0.057	0.045	0.015	128.252	4.852	7.407	-0.080	-0.180	15.300	61.100	2.628	31.175	148.718	0.934
RUN#6_0027.LAB	4/4/2014	6:51:15 PM	-0.016	0.035	0.016	114.204	4.663	6.697	0.055	-0.167	16.401	63.698	5.318	27.508	148.921	0.935
RUN#6_0028.LAB	4/4/2014	6:52:13 PM	0.023	0.035	0.011	121.981	4.927	7.573	-0.240	-0.147	15.345	56.894	5.834	25.075	148.718	0.933
RUN#6_0029.LAB	4/4/2014	6:53:11 PM	0.042	0.033	0.006	107.464	4.574	6.719	-0.219	-0.126	16.514	67.980	3.756	23.108	148.718	0.937
RUN#6_0030.LAB	4/4/2014	6:54:09 PM	-0.011	0.048	0.010	128.875	5.081	7.297	-0.185	-0.175	15.897	64.562	7.099	26.675	148.820	0.930
RUN#6_0031.LAB	4/4/2014	6:55:36 PM	-0.059	0.034	0.013	139.396	4.949	6.711	0.131	-0.156	15.654	58.794	7.361	30.453	148.718	0.929
RUN#6_0032.LAB	4/4/2014	6:56:34 PM	-0.073	0.033	0.017	122.163	4.780	6.275	-0.078	-0.109	16.497	64.327	0.689	30.913	148.820	0.930
RUN#6_0033.LAB	4/4/2014	6:57:32 PM	-0.078	0.045	0.016	137.754	5.103	6.941	-0.048	-0.182	15.203	58.856	1.833	31.755	148.718	0.921
RUN#6_0034.LAB	4/4/2014	6:58:30 PM	-0.065	0.034	0.009	115.735	4.780	6.928	0.107	-0.142	17.226	63.630	5.874	29.742	148.718	0.930
RUN#6_0035.LAB	4/4/2014	6:59:28 PM	0.000	0.035	0.010	109.754	4.721	6.276	-0.071	-0.153	16.707	65.357	3.237	26.568	148.718	0.933
RUN#6_0036.LAB	4/4/2014	7:00:26 PM	0.025	0.040	0.017	122.525	5.077	7.926	-0.210	-0.160	15.698	60.870	4.729	24.561	148.921	0.932
RUN#6_0037.LAB	4/4/2014	7:01:24 PM	0.017	0.042	0.010	120.025	5.002	7.722	-0.025	-0.122	17.480	62.176	5.102	24.029	148.718	0.932
RUN#6_0038.LAB	4/4/2014	7:04:53 PM	-0.073	0.043	0.008	121.566	4.862	7.183	-0.028	-0.173	16.090	63.283	6.276	30.726	148.820	0.924
RUN#6_0039.LAB	4/4/2014	7:05:51 PM	-0.071	0.041	0.010	124.019	4.838	6.809	-0.146	-0.165	16.017	69.192	4.027	30.453	148.718	0.922
RUN#6_0040.LAB	4/4/2014	7:06:49 PM	-0.002	0.037	0.008	121.410	4.974	6.554	-0.134	-0.114	16.687	58.480	4.358	27.164	148.718	0.934
RUN#6_0041.LAB	4/4/2014	7:07:47 PM	0.046	0.033	0.013	112.256	4.934	6.247	0.192	-0.116	15.798	63.490	4.041	24.539	148.921	0.931
RUN#6_0042.LAB	4/4/2014	7:08:45 PM	0.030	0.034	0.017	113.497	4.844	6.233	-0.063	-0.114	16.513	67.467	5.164	25.364	148.820	0.937
RUN#6_0043.LAB	4/4/2014	7:10:12 PM	-0.057	0.042	0.012	120.548	4.912	6.461	-0.190	-0.146	15.422	67.846	5.478	30.180	148.718	0.930
RUN#6_0044.LAB	4/4/2014	7:11:11 PM	-0.081	0.036	0.017	113.258	4.667	6.714	-0.035	-0.146	15.660	69.384	4.320	30.527	148.718	0.932
RUN#6_0045.LAB	4/4/2014	7:12:09 PM	-0.063	0.035	0.010	126.255	4.884	7.238	-0.096	-0.186	14.827	67.243	5.772	30.180	148.820	0.933
RUN#6_0046.LAB	4/4/2014	7:13:07 PM	-0.040	0.043	0.015	134.751	5.058	7.946	-0.121	-0.159	15.109	57.842	4.997	29.176	148.718	0.934
RUN#6_0047.LAB	4/4/2014	7:14:05 PM	-0.031	0.036	0.010	116.770	4.904	7.234	0.034	-0.166	16.371	60.661	4.019	26.263	148.718	0.931
RUN#6_0048.LAB	4/4/2014	7:15:03 PM	0.033	0.035	0.012	109.278	4.810	6.725	-0.045	-0.120	17.063	68.540	4.447	23.951	148.718	0.930
RUN#6_0049.LAB	4/4/2014	7:16:01 PM	-0.020	0.044	0.014	118.930	4.991	6.657	0.034	-0.167	16.502	67.452	4.254	27.565	148.718	0.929
RUN#6_0050.LAB	4/4/2014	7:16:59 PM	-0.069	0.040	0.018	126.033	5.002	6.957	-0.140	-0.149	15.457	66.079	4.170	30.017	148.718	0.926
RUN#6_0051.LAB	4/4/2014	7:17:57 PM	-0.084	0.045	0.016	123.062	4.814	7.471	-0.143	-0.146	15.179	64.163	-2.226	30.904	148.718	0.925
RUN#6_0052.LAB	4/4/2014	7:18:55 PM	-0.077	0.040	0.011	122.392	4.786	7.021	-0.045	-0.152	15.248	66.458	5.647	30.124	148.820	0.938
RUN#6_0053.LAB	4/4/2014	7:19:53 PM	-0.057	0.042	0.015	116.545	4.861	7.424	-0.102	-0.188	15.736	62.465	5.537	27.714	148.820	0.935
RUN#6_0054.LAB	4/4/2014	7:20:51 PM	0.011	0.035	0.013	105.000	4.638	6.264	-0.041	-0.122	16.861	70.501	4.249	25.088	148.718	0.935
RUN#6_0055.LAB	4/4/2014	7:21:49 PM	0.021	0.031	0.008	112.280	4.914	5.630	-0.122	-0.144	16.027	65.962	4.245	23.595	148.718	0.937
Run #6 Post Test Spike																
RUN#6 QA_0001.LAB	4/4/2014	7:25:02 PM	0.370	0.650	0.011	114.058	4.409	5.921	-0.152	-0.381	14.721	63.565		28.707	149.023	0.926
RUN#6 QA_0002.LAB	4/4/2014	7:26:00 PM	0.559	0.648	0.007	114.651	4.443	5.746	-0.372	-0.351	14.627	63.807		28.382	148.921	0.932
RUN#6 QA_0003.LAB	4/4/2014	7:26:58 PM	0.629	0.651	0.016	125.407	4.780	6.809	-0.135	-0.388	14.092	54.395		28.150	149.023	0.929
RUN#6 QA_0004.LAB	4/4/2014	7:28:25 PM	0.862	0.669	0.008	107.760	4.542	6.223	-0.393	-0.396	13.853	62.096		24.038	148.921	0.937
RUN#6 QA_0005.LAB	4/4/2014	7:29:23 PM	0.994	0.680	0.014	102.675	4.374	5.836	-0.239	-0.379	15.772	65.557		22.194	148.921	0.935
RUN#6 QA_0006.LAB	4/4/2014	7:30:21 PM	1.026	0.667	0.012	107.161	4.557	6.400	-0.257	-0.360	15.496	61.388		23.517	148.820	0.940
RUN#6 QA_0007.LAB	4/4/2014	7:31:19 PM	0.950	0.648	0.014	110.913	4.501	6.039	-0.052	-0.365	15.463	65.298		27.501	148.820	0.932
RUN#6 QA_0008.LAB	4/4/2014	7:32:17 PM	0.864	0.646	0.013	110.302	4.435	6.656	-0.179	-0.427	15.456	63.434		28.117	148.921	0.932
RUN#6 QA_0009.LAB	4/4/2014	7:33:16 PM	0.897	0.656	0.010	112.788	4.429	6.486	-0.167	-0.408	14.936	64.335		28.172	148.820	0.925
RUN#6 QA_0010.LAB	4/4/2014	7:34:14 PM	0.950	0.669	0.009	133.804	4.899	6.897	-0.406	-0.391	14.189	53.776		27.808	148.820	0.927
RUN#6 QA_0011.LAB	4/4/2014	7:35:12 PM	1.056	0.653	0.014	98.089	4.090	6.201	-0.230	-0.347	15.766	64.822		24.176	148.718	0.936
RUN#6 QA_0012.LAB	4/4/2014	7:36:10 PM	1.117	0.668	0.014	98.105	4.337	5.935	-0.243	-0.354	15.427	67.736		22.030	148.820	0.936
RUN#6 QA_0013.LAB	4/4/2014	7:37:08 PM	1.180	0.678	0.007	110.464	4.565	6.540	-0.312	-0.374	15.035	63.883		21.936	148.718	0.933
RUN#6 QA_0014.LAB	4/4/2014	7:38:35 PM	1.029	0.647	0.012	116.357	4.603	6.623	-0.266	-0.393	15.059	60.208		27.088	148.718	0.930
RUN#6 QA_0015.LAB	4/4/2014	7:40:31 PM	0.954	0.628	0.012	108.943	4.362	6.396	-0.142	-0.443	16.006	61.766		28.883	148.718	0.930
RUN#6 QA_0016.LAB	4/4/2014	7:41:29 PM	0.911	0.470	0.011	121.330	4.712	6.427	-0.172	-0.400	15.217	60.110		29.594	149.125	0.929
RUN#6 QA_0017.LAB	4/4/2014	7:42:27 PM	0.344	0.030	0.012	112.973	4.611	6.746	0.115	-0.389	17.400	69.664		27.653	149.125	0.936
RUN#6 QA_0018.LAB	4/4/2014	7:43:25 PM	0.226	0.031	0.011	118.735	4.801	6.908	-0.186	-0.384	16.722	68.621		25.203	148.921	0.935
RUN#6 QA_0019.LAB	4/4/2014	7:44:23 PM	0.150	0.037	0.013	116.716	4.954	7.182	-0.020	-0.409	17.258	69.364		24.798	148.514	0.935
RUN#6 QA_0020.LAB	4/4/2014	7:45:22 PM	0.074	0.034	0.009	122.359	5.000	7.235	-0.307	-0.456	17.229	70.688		28.735	148.514	0.927
RUN#6 QA_0021.LAB	4/4/2014	7:46:20 PM	0.018	0.033	0.004	119.709	4.877	6.821	0.010	-0.433	16.590	67.971		30.334	148.514	0.927
Run #6 Post Test CTS																
RUN#6 CTS_0001.LAB	4/4/2014	7:55:01 PM	-0.003	-0.001	0.002	13.570	0.000	0.071	-0.004	-0.008	-0.042	16.939		-0.006	148.921	1.014
RUN#6 CTS_0002.LAB	4/4/2014	7:55:59 PM	-0.020	-0.001	0.002	13.898	0.000	0.120	-0.031	0.028	-0.048	16.934		0.007	149.023	1.015
RUN#6 CTS_0003.LAB	4/4/2014	7:56:57 PM	0.010	-0.002	0.001	13.935	0.000	-0.102	-0.019	-0.009	-0.042	17.004		0.000	149.125	1.015

Example Calculations, Based on Run #1

Barometric Pressure at the Sampling Location, Corrected (EPA Method 2, Section 6.5)

Pbar = Pbar,meas - (Elev x 0.1/100)

Pbar,meas = Barometric pressure as measured	=	29.89	in. Hg
Elev = elevation of sampling location relative to barometer	=	100	feet
Pbar = Barometric pressure at the sampling site	=	29.79	in. Hg

$$\text{Pbar} = 29.89 - \left(\frac{100 \times 0.1}{100}\right)$$

Pbar = 29.79

Absolute Stack Pressure (EPA Method 2, Section 6.5)

Pbar = Barometric pressure at the sampling site	=	29.79	in. Hg
Pg = Stack Static Pressure	=	-0.24	in. Hg
Ps = Absolute Stack Pressure	=	29.77	in. Hg

$$\text{Ps} = 29.79 + \left(\frac{-0.24}{13.6}\right)$$

Ps = 29.77

Volume of Water Vapor Condensed, corrected to standard conditions, ft3 (US EPA Method 4, Sect. 12.1.2 and 12.1.3)

Vw(std) = K3 x (Wf - Wi)

K3 = Conversion Constant	=	0.04715	
(Wf - Wi) = Total weight of liquid collected	=	297.5	ft3/g

Vw(std) = 0.04715 x 297.5

Vw(std) = 14.03 ft3

Moisture Content, proportion, by volume (US EPA Method 5, Eq. 5-3)

$$\text{Bws} = \frac{\text{Vw(std)}}{\text{Vm(std)} + \text{Vw(std)}}$$

Vw(std) = Volume of water vapor condensed	=	14.027	ft3
Vm(std) = Dry Gas Volume	=	33.885	ft3

$$\text{Bws} = \frac{14.027}{33.885 + 14.027}$$

Bws = 0.2928

Moisture content at saturation:

From ASME 1967 Steam Tables (Lookup Table)

Bws (sat) = 26.064 0.3

For further calculations:

Bws = 0.293 29

Dry Molecular Weight of Stack Gas, lb/lb-mole (US EPA Method 3, Eq. 3-1)

Md = MWCO2(%CO2) + MWO2(%O2) + MWN2(%N2)

MWCO2= Molecular weight of CO2, divided by 100	=	0.44	lb/lb-mole
%CO2 = Percent CO2 by volume, dry basis	=	6.1	%
MWO2 = Molecular weight of O2, divided by 100	=	0.32	lb/lb-mole
%O2 = Percent O2 by volume, dry basis	=	14.7	%
MWN2 = Molecular weight of N2, divided by 100	=	0.28	lb/lb-mole
= 100% - %CO - %CO2 - %O2 - %H2 - %CH4	=	79.3	%

Md =(0.44 x 6.1) + (0.32 x 14.7) + (0.28 x 79.3)

Md = 29.56 lb/lb-mole

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Molecular Weight of stack gas, lb/lb-mole (US EPA Method 2, Eq. 2-6)

Ms = Md (1-Bws)+18.0(Bws)

Md= Dry molecular weight of stack gas	=	29.56	lb/lb-mole
Bws= Proportion of water vapor, by volume	=	0.2606	proportion
18.0 = Molecular Weight of H2O	=	18.00	lb/lb-mole

Ms = 29.56 x (1 - 0.261) + (18.00 x 0.261)

Ms = 26.54

Dry Gas Volume, corrected to actual conditions, ft3

Vm(actual) = Vm x Y

Vm = Volume of gas sample, dry	=	36.119	ft3
Y = Dry gas meter calibration factor	=	0.9808	

Vm(actual) = 36.119 x 0.9808

Vm(actual) = 35.426

Dry Gas Volume, corrected to standard conditions, ft3 (US EPA Method 5, Eq. 5-1)

$$\text{Vm(std)} = \text{Vm} \times Y \times \frac{\text{Tstd} \times (\text{Pbar} + (\text{deltaH} / 13.6))}{\text{Tm} \times \text{Pstd}}$$

Vm = Volume of gas sample, dry	=	36.119	ft3
Y = Dry gas meter calibration factor	=	0.9808	
Tstd = Standard Temperature	=	528.0	deg R
Pbar = Barometric pressure at the sampling site	=	29.79	in. Hg
DH = Average pressure differential across the orifice meter	=	1.28	in. H2O
13.6 = Conversion factor		13.6	in. H2O/in. Hg
Tm = Absolute average DGM temperature		551.3	deg R

$$\text{Vm(std)} = \frac{36.119 \times 0.9808 \times 528.0 \times (29.79 + (1.28 / 13.6))}{551.3 \times 29.92}$$

Vm(std) = 33.885

Average Stack Gas Velocity, ft/sec (US EPA Method 2, Eq. 2-7)

vs = Kp x Cp x SqrtDPavg x sqrt(Ts/(Ps x Ms))

Kp= Velocity equation constant	=	85.49	ft/sec[((lb/lb-mole)(in.Hg))/((degR)(in.H2O))]1/2
Cp = S type pitot tube coefficient	=	0.84	
SqrtDPavg=ave. sqrt. of the velocity head of stack gas	=	0.58	in.H2O
Ts = Absolute stack temperature	=	611.04	deg R
Ps = Absolute stack pressure	=	29.77	in. Hg
Ms = Molecular Weight of stack gas	=	26.54	lb/lb-mole

$$\text{vs} = 85.49 \times 0.84 \times 0.58 \times \left(\frac{611.0}{29.77 \times 26.54}\right)0.5$$

vs = 36.39 ft/sec

vs = 2,184 ft/min

Average Stack Gas Volumetric Flow Rate, Actual Conditions

Qactual = vs x A

vs = Average stack gas velocity	=	36.39	ft/sec
A = Cross sectional area of stack	=	28.27	ft2

Qactual = 36.39 x 28.27

Qactual = 1029 cubic feet per second

Qactual = 61,740 cubic feet per minute

Qactual = 3,704,400 cubic feet per hour

Average Stack Gas Dry Volumetric Flow Rate, dscf/hr (US EPA Method 2, Eq. 2-8)

$$Q = \frac{3600 \times (1-Bws) \times vs \times A \times Tstd \times Ps}{Ts \times Pstd}$$

3600= Conversion factor	=	3600	sec/hr
Bws = Proportion of water vapor, by volume	=	0.293	proportion
vs= Average stack gas velocity	=	36.39	ft/sec
A = Cross sectional area of stack	=	28.27	ft2
Tstd = Standard absolute temperature	=	528	degR
Ps = Absolute stack pressure	=	29.77	in. Hg
Ts = Absolute stack temperature	=	611.0	degR
Pstd = Standard absolute pressure	=	29.92	in. Hg

$$Qs = \frac{3600 \times (1.00 - 0.293) \times 36.39 \times 28.274 \times 528 \times}{611.0 \times 29.92}$$

Qs = 2,252,659 dscf/hr

= 37,544 dscf/min

Average Stack Gas Wet Basis Volumetric Flow Rate (scf/hr)

$$Qw = \frac{Q}{(1-Bws)}$$

Q = Average Stack Gas Dry Volumetric Flow Rate	=	2,252,659	dscf/hr
Bws = Proportion of water vapor, by volume	=	0.293	proportion

$$Qw = \frac{2,252,659}{(1.00 - 0.293)}$$

Qw = 3,185,169 wscf/hr

= 53,086 wscf/min

Isokinetic Variation, % (US EPA Method 5, Eq. 5-8)

$$I = \frac{100 \times Ts \times Vm(std) \times Pstd}{60 \times Tstd \times Ps \times vs \times An \times min \times (1 - Bws)}$$

100 = Conversion to Percent	=	100	
Ts = Absolute stack temperature	=	611.0	degR
Vm(std) = Dry Gas Volume	=	33.885	ft3
Pstd = Standard absolute pressure	=	29.92	in. Hg
60 = Sec/Min	=	60	Sec/Min
Tstd = Standard absolute temperature	=	528.00	degR
Ps = Absolute stack pressure	=	29.77	in. Hg
vs = Average stack gas velocity	=	36.39	ft/sec
An = Cross-sectional Area of nozzle	=	0.000415	ft2
min = Total sampling time	=	60	minutes
Bws = Proportion of water vapor, by volume	=	0.261	proportion

$$I = \frac{100 \times 611.0 \times 33.885 \times 29.92}{60.00 \times 528.00 \times 29.77 \times 36.39 \times 0.000415 \times 60 \times (}$$

I = 97.92

Post-Test Calibration Check (US EPA Guideline Document EMTIC GD-26)

$$Yqa = \text{min} / Vm \times \frac{0.0319 \times Tm}{DH@ \times (Pbar + DH/13.6)} \times \frac{29}{Md} \times (DH)1/2avg$$

min = Total sampling time	=	60	minutes
Vm(actual) = Dry gas volume, actual conditions	=	36.119	ft3
Tm = Absolute average DGM temperature	=	551.3	degR
DH@ = Meter orifice pressure at 0.75 ft3/min sampling rate	=	1.91	in. H2O
Pbar = Barometric pressure at the sampling site	=	29.79	in. Hg
DH = Average pressure differential across the orifice meter	=	1.28	in. H2O
(DH)1/2avg = Average of square root values of DH	=	1.122	
Md= Dry molecular weight of stack gas	=	29.56	lb/lb-mole

$$Yqa = \text{min} / Vm \times \frac{0.0319 \times 551.333}{1.91 \times (29.79 + 1.28/13.6)} \times \frac{29}{29.56} \times 1.122$$

Yqa = 1.025

Concentration Calculation

$$ppmv = \frac{Mpoll \times (T(^{o}K) + {}^{o}C)}{(CF)(MW)}$$

Mass units of measurement: **mg/dscm**

Pollutant species **Fluoride**

Mpoll = mass of pollutant in recovered sample	=	0.715	mg/dscm
T = Std Temperature	=	273.15	K
°C = Ambient Temperature	=	20	
CF = Conversion factor	=	12.187	
MW = Molecular weight of gas	=	18.998	

$$Ce = \frac{0.715 \times 2.93E+02}{231.534}$$

Ce = 0.905 ppmv

Oxygen Correction Calculation

$$C@\ x\%\ O2 = Ce \times \frac{(20.9-CBO2)}{(20.9-O2)}$$

Ce = concentration of specified pollutant emitted	=	9.05E-01	ppm
CBO2 = Oxygen concentration correction basis	=	3	% O2
O2 = Measured oxygen concentration	=	14.7	%

$$C@\ 3\%O2 = 9.05E-01 \times \frac{(20.9 - 3)}{(20.9 - 14.70)}$$

C@ 3%O2 = 2.61 ppmv @3% O2

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PCS PHOSPHATE CO
Aurora Division

Calciner #3

Non-Routine Water Analyses

Date 4/17/14

Tech. RBL

Start 1250

Stop 1327

Refrig. 4 oC

F- Meter Calib

0.3 ppm F- 0.314 MV= N/A N/A

1 ppm F- 1.03 MV= 100.8

10 ppm F- 10.00 MV= 43.1

Crv. Slope 57.7 MV 0.1 ppm= 0.0973

Field Blank = 0.000 mg/L

Notes

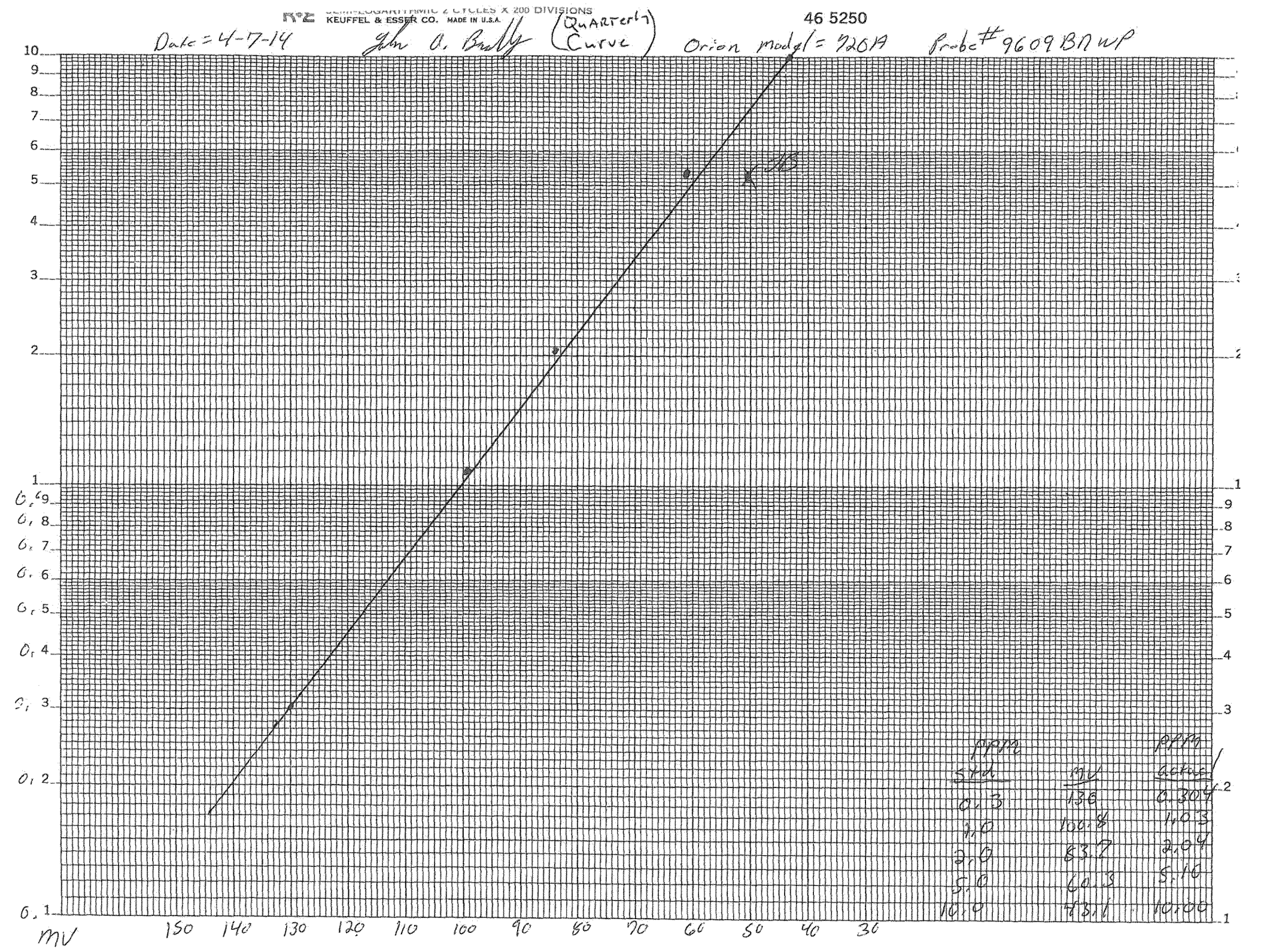
Additional 0.1 ppm Standard analyzed.

Total Volume = 1000 mls For All Samples

Std. Methods 4500 F L TDS 2540 C TSS 2540 C

Sample Location	pH	Fluorides (2 dec.) Dil.	Rd Out	Mg/L												
Test-1		10/10	0.686	0.686												
Test-2		10/10	0.343	0.343												
Test-3		10/10	0.194	0.194												
Test-4		10/10	0.157	0.157												
Test-4 (D)		10/10	0.137	0.137												
EP-407		10/10	0.491	0.491												
DMR QA		10/10	2.11	2.11												
Dup. ( )																

ance Calibration		Min Detection Limits				Calculations			F- mg/l	P mg/l	pH	TH mg/l
Std. Wt.(gms):	2.0	P	0.1 mg/l	TDS	10.0 mg/l	(Rd.Out x Dil.)	Hardness	QA Stds	2.11			
ct. Wt.(gms):		F-	0.1 mg/l	TSS	4.0 mg/l	Rd.Out x 50)/Aliq.	Titr x 40	True Values	2.13			
		Total Hardness 0 - 200 mg/l				TDS = (Wt 2 - Wt 1)x(1x10^6)/Wt 1		Lot Nos.	B117500			
						TSS = (Final-Tare)x(1x10^6)/aliq						


KEUFFEL & ESSER CO. MADE IN U.S.A.
46 5250
Date = 4-7-14
John A. Brady
(Quarterly Curve)
Orion model = 720A
Probe # 9609 BN WP
10
9
8
7
6
5
4
3
2
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
150
140
130
120
110
100
90
80
70
60
50
40
30
MV
ppm Std
mV
ppm actual
0.3
138
0.304
1.0
100.8
1.03
2.0
83.7
2.04
5.0
60.3
5.10
10.0
43.1
10.00

ERA
A Waters Company

Stationary Source Audit Program Data Reporting Form
Project #: 031114R

Lab Name: URS Corporation **ERA Customer Number: U119153**

INSTRUCTIONS:
Please fill in the results, methods references and analysis dates for the analyte(s) you wish to report for Project #031114R. Questions? See the Data Reporting Instructions section of your Data Package or call ERA at 1-800-372-0122. Please photocopy this form if you are reporting multiple methods.

Stationary Source Audit Program Fluoride in Impinger Solution (cat# 1141)

Method Description EPA METHOD 13B **Rev/Ed**

Analysis Date (mm-dd) 04 - 07 **Analyst** PCS **Workgroup**

TNI Code	Analyte	Units	PTRL	Concentration Range	Reported Value
1730	Fluoride	mg/dscm	0.850	1.00 to 50.0	0.491

16341 Table Mountain Pkwy • Golden, CO 80403 • 800.372.0122 • 303.431.8454 • fax 303.421.0159 • www.eraqc.com

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ERA

A Waters Company

Invoice #	715990
Customer #	U119153
Date	3/11/2014
Page	1 of 1

Packing Slip

Project #	031114R

Bill To:

URS Corporation
1600 Perimeter Park
Suite 400
Morrisville, NC, USA 27560

Accounts Payable

Ship To:

PCS Phosphate Aurora
1530 NC Hwy 306 S
Aurora, NC, USA 27806

Jimmy Hardy

Email Address: stephanie.chesebro@urs.com

(919) 461-1539

Order Comments:

TPID: 31829570.0006 [redacted] M13b

1281119

Cust Svc Rep	Payment Terms	Shipping Method	Purchase Order #	Order #
	NET 30	FEDEX SOS	31829570.0006 EP-407	1-5DDWOY031114FS

QTY	CAT #	Product	Type	Lot #	Study #
1	1441	Fluoride in Impinger Solution	PT	110-1141 REQUEST	SSAP 110

REPORT ANY PROBLEMS WITHIN 5 DAYS

Please check all items in the shipment against the attached packing list **immediately** upon receipt. ERA will **immediately replace** any broken or incorrect items related to this shipment that are **reported within 5 business days.**

CALL ERA CUSTOMER SERVICE AT 1-888-372-0122 FOR PROBLEMS WITH THIS SHIPMENT

All products Country of Origin: USA Unless otherwise specified.

715990

ERA
A Waters Company

Jimmy Hardy
PCS Phosphate
1530 NC Hwy 306 S
Aurora, NC 27806

031114R Final Report

Air and Emissions Proficiency Testing

031114R Evaluation Final Complete Report

ERA
A Waters Company

Jimmy Hardy
PCS Phosphate
1530 NC Hwy 306 S
Aurora, NC 27806
252-322-8154

EPA ID: Not Reported
ERA Customer Number: T217202

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Z Score	Study Mean	Study Standard Deviation	Analyst Name
SSAP Fluoride in Impinger Solution (cat# 1141) Study Dates: 03/11/14 - 04/15/14												
1730	Fluoride	mg/dscm	0.491	0.499	0.424 - 0.574	Acceptable	EPA 13B 2000	4/7/2014	0			PCS

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URS

Attachment C
Process Data

Calciner No. 2 (EP ID No. 202)

Time	Phosphate ore mass flow rate to the caiciner	Beneficiated rock mass flow rate to the calciner	Product mass flow rate from the calciner	Phosphate ore moisture content	Beneficiated rock moisture content
	(tons/hr)	(tons/hr)	(tons/hr)	(%)	(%)
3/30/14 0:00	26.7	23.4	21.6	12.2	12.2
3/30/14 1:00	23.7	20.8	19.2	12.2	12.2
3/30/14 2:00	20.8	18.2	16.8	12.2	12.2
3/30/14 3:00	17.8	15.6	14.4	12.2	12.2
3/30/14 4:00	14.8	13.0	12.0	12.2	12.2
3/30/14 5:00	11.8	10.4	9.6	12.2	12.2
3/30/14 6:00	8.9	7.8	7.2	12.2	12.2
3/30/14 7:00	5.9	5.2	4.8	12.2	12.2
3/30/14 8:00	2.9	2.6	2.4	12.2	12.2
3/30/14 9:00	15.3	13.4	12.4	12.2	12.2
3/30/14 10:00	38.6	33.9	31.3	12.2	12.2
3/30/14 11:00	17.6	15.5	14.3	12.2	12.2
3/30/14 12:00	16.1	14.1	13.0	12.2	12.2
3/30/14 13:00	40.5	35.6	32.9	12.2	12.2
3/30/14 14:00	31.6	27.7	25.6	12.2	12.2
3/30/14 15:00	15.3	13.4	12.4	12.2	12.2
3/30/14 16:00	25.3	22.3	20.5	12.2	12.2
3/30/14 17:00	48.1	42.3	39.0	12.2	12.2
3/30/14 18:00	45.3	39.8	36.7	12.2	12.2
3/30/14 19:00	42.4	37.3	34.4	12.2	12.2
3/30/14 20:00	39.6	34.7	32.1	12.2	12.2
3/30/14 21:00	36.7	32.2	29.7	12.2	12.2
3/30/14 22:00	33.8	29.7	27.4	12.2	12.2
3/30/14 23:00	31.0	27.2	25.1	12.2	12.2
3/31/14 0:00	28.1	24.6	22.7	12.4	12.4
3/31/14 1:00	25.2	22.1	20.4	12.4	12.4
3/31/14 2:00	22.4	19.6	18.1	12.4	12.4
3/31/14 3:00	19.5	17.1	15.8	12.4	12.4
3/31/14 4:00	16.6	14.6	13.5	12.4	12.4
3/31/14 5:00	13.8	12.1	11.1	12.4	12.4
3/31/14 6:00	10.9	9.6	8.8	12.4	12.4
3/31/14 7:00	8.1	7.1	6.5	12.4	12.4
3/31/14 8:00	5.2	4.6	4.2	12.4	12.4
3/31/14 9:00	2.3	2.0	1.9	12.4	12.4
3/31/14 10:00	32.4	28.4	26.2	12.4	12.4
3/31/14 11:00	49.6	43.5	40.1	12.4	12.4
3/31/14 12:00	48.7	42.7	39.4	12.4	12.4
3/31/14 13:00	47.7	41.8	38.6	12.4	12.4
3/31/14 14:00	46.7	41.0	37.8	12.4	12.4
3/31/14 15:00	45.8	40.1	37.0	12.4	12.4
3/31/14 16:00	44.8	39.3	36.3	12.4	12.4
3/31/14 17:00	49.2	43.1	39.8	12.4	12.4
3/31/14 18:00	48.2	42.2	39.0	12.4	12.4
3/31/14 19:00	46.3	40.6	37.5	12.4	12.4
3/31/14 20:00	44.5	39.0	36.0	12.4	12.4
3/31/14 21:00	42.6	37.3	34.5	12.4	12.4
3/31/14 22:00	40.7	35.7	32.9	12.4	12.4
3/31/14 23:00	38.9	34.1	31.4	12.4	12.4
4/1/14 0:00	37.0	32.4	30.4	12.4	12.4
4/1/14 1:00	35.1	30.8	28.8	12.4	12.4
4/1/14 2:00	33.3	29.2	27.3	12.4	12.4
4/1/14 3:00	31.4	27.5	25.8	12.4	12.4
4/1/14 4:00	29.5	25.9	24.3	12.4	12.4

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Calciner No. 2 (EP ID No. 202)

Time	Phosphate ore mass flow rate to the calciner	Beneficiated rock mass flow rate to the calciner	Product mass flow rate from the calciner	Phosphate ore moisture content	Beneficiated rock moisture content
	(tons/hr)	(tons/hr)	(tons/hr)	(%)	(%)
4/1/14 5:00	27.7	24.2	22.7	12.4	12.4
4/1/14 6:00	25.8	22.6	21.2	12.4	12.4
4/1/14 7:00	23.9	21.0	19.7	12.4	12.4
4/1/14 8:00	22.1	19.3	18.1	12.4	12.4
4/1/14 9:00	20.2	17.7	16.6	12.4	12.4
4/1/14 10:00	18.3	16.1	15.1	12.4	12.4
4/1/14 11:00	16.5	14.4	13.5	12.4	12.4
4/1/14 12:00	14.6	12.8	12.0	12.4	12.4
4/1/14 13:00	12.7	11.2	10.5	12.4	12.4
4/1/14 14:00	10.9	9.5	8.9	12.4	12.4
4/1/14 15:00	9.0	7.9	7.4	12.4	12.4
4/1/14 16:00	7.1	6.3	5.9	12.4	12.4
4/1/14 17:00	5.3	4.6	4.3	12.4	12.4
4/1/14 18:00	3.4	3.0	2.8	12.4	12.4
4/1/14 19:00	1.5	1.3	1.3	12.4	12.4
4/1/14 20:00	32.2	28.2	26.4	12.4	12.4
4/1/14 21:00	56.4	49.4	46.3	12.4	12.4
4/1/14 22:00	59.6	52.2	49.0	12.4	12.4
4/1/14 23:00	59.8	52.4	49.1	12.4	12.4
4/2/14 0:00	59.9	53.3	49.9	11.1	11.1
4/2/14 1:00	60.1	53.4	50.0	11.1	11.1
4/2/14 2:00	60.2	53.5	50.1	11.1	11.1
4/2/14 3:00	60.4	53.7	50.3	11.1	11.1
4/2/14 4:00	60.5	53.8	50.4	11.1	11.1
4/2/14 5:00	60.6	53.9	50.5	11.1	11.1
4/2/14 6:00	61.9	55.0	51.5	11.1	11.1
4/2/14 7:00	47.6	42.3	39.7	11.1	11.1
4/2/14 8:00	53.7	47.7	44.7	11.1	11.1
4/2/14 9:00	43.7	38.8	36.4	11.1	11.1
4/2/14 10:00	28.1	25.0	23.4	11.1	11.1
4/2/14 11:00	12.6	11.2	10.5	11.1	11.1
4/2/14 12:00	21.7	19.3	18.1	11.1	11.1
4/2/14 13:00	40.4	35.9	33.7	11.1	11.1
4/2/14 14:00	24.8	22.1	20.7	11.1	11.1
4/2/14 15:00	26.7	23.8	22.3	11.1	11.1
4/2/14 16:00	27.3	24.3	22.7	11.1	11.1
4/2/14 17:00	10.6	9.4	8.8	11.1	11.1
4/2/14 18:00	30.0	26.6	25.0	11.1	11.1
4/2/14 19:00	47.2	42.0	39.4	11.1	11.1
4/2/14 20:00	55.1	49.0	45.9	11.1	11.1
4/2/14 21:00	32.1	28.6	26.8	11.1	11.1
4/2/14 22:00	59.4	52.8	49.5	11.1	11.1
4/2/14 23:00	59.3	52.7	49.4	11.1	11.1
4/3/14 0:00	54.8	48.4	45.3	11.6	11.6

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Calciner No. 3 (EP ID No. 203)

Time	Phosphate ore mass flow rate to the calciner	Beneficiated rock mass flow rate to the calciner	Product mass flow rate from the caiciner	Phosphate ore moisture content	Beneficiated rock moisture content
	(tons/hr)	(tons/hr)	(tons/hr)	(%)	(%)
4/2/14 12:00	18.7	16.5	15.4	11.9	11.9
4/2/14 13:00	58.9	51.9	48.6	11.9	11.9
4/2/14 14:00	37.7	33.2	31.1	11.9	11.9
4/2/14 15:00	16.5	14.5	13.6	11.9	11.9
4/2/14 16:00	37.9	33.4	31.3	11.9	11.9
4/2/14 17:00	59.7	52.6	49.2	11.9	11.9
4/2/14 18:00	60.6	53.4	50.0	11.9	11.9
4/2/14 19:00	61.7	54.3	50.9	11.9	11.9
4/2/14 20:00	62.8	55.3	51.8	11.9	11.9
4/2/14 21:00	63.9	56.3	52.8	11.9	11.9
4/2/14 22:00	64.6	56.9	53.3	11.9	11.9
4/2/14 23:00	62.9	55.4	51.9	11.9	11.9
4/3/14 0:00	61.0	53.9	50.5	11.6	11.6
4/3/14 1:00	61.0	53.9	50.5	11.6	11.6
4/3/14 2:00	61.5	54.4	50.9	11.6	11.6
4/3/14 3:00	62.0	54.8	51.3	11.6	11.6
4/3/14 4:00	62.5	55.2	51.7	11.6	11.6
4/3/14 5:00	63.0	55.6	52.1	11.6	11.6
4/3/14 6:00	63.4	56.1	52.5	11.6	11.6
4/3/14 7:00	63.9	56.5	52.9	11.6	11.6
4/3/14 8:00	64.4	56.9	53.3	11.6	11.6
4/3/14 9:00	55.8	49.3	46.2	11.6	11.6
4/3/14 10:00	37.9	33.5	31.4	11.6	11.6
4/3/14 11:00	20.4	18.0	16.9	11.6	11.6
4/3/14 12:00	11.5	10.2	9.5	11.6	11.6
4/3/14 13:00	34.8	30.7	28.8	11.6	11.6
4/3/14 14:00	57.3	50.6	47.4	11.6	11.6
4/3/14 15:00	24.5	21.6	20.3	11.6	11.6
4/3/14 16:00	52.0	46.0	43.1	11.6	11.6
4/3/14 17:00	56.8	50.2	47.0	11.6	11.6
4/3/14 18:00	51.8	45.8	42.9	11.6	11.6
4/3/14 19:00	40.5	35.8	33.5	11.6	11.6
4/3/14 20:00	29.2	25.8	24.2	11.6	11.6
4/3/14 21:00	17.9	15.8	14.8	11.6	11.6
4/3/14 22:00	6.6	5.8	5.5	11.6	11.6
4/3/14 23:00	27.8	24.6	23.1	11.6	11.6
4/4/14 0:00	28.4	24.9	23.4	12.2	12.2
4/4/14 1:00	68.4	60.1	56.3	12.2	12.2
4/4/14 2:00	112.3	98.6	92.3	12.2	12.2
4/4/14 3:00	65.2	57.2	53.6	12.2	12.2
4/4/14 4:00	60.2	52.9	49.5	12.2	12.2
4/4/14 5:00	60.4	53.0	49.7	12.2	12.2
4/4/14 6:00	60.6	53.2	49.8	12.2	12.2
4/4/14 7:00	60.8	53.3	50.0	12.2	12.2
4/4/14 8:00	60.9	53.5	50.1	12.2	12.2
4/4/14 9:00	61.1	53.7	50.3	12.2	12.2
4/4/14 10:00	59.4	52.1	48.9	12.2	12.2
4/4/14 11:00	51.9	45.6	42.7	12.2	12.2
4/4/14 12:00	44.1	38.7	36.2	12.2	12.2
4/4/14 13:00	36.2	31.8	29.7	12.2	12.2
4/4/14 14:00	28.3	24.8	23.3	12.2	12.2
4/4/14 15:00	20.4	17.9	16.8	12.2	12.2
4/4/14 16:00	12.5	11.0	10.3	12.2	12.2
4/4/14 17:00	4.6	4.1	3.8	12.2	12.2
4/4/14 18:00	55.6	48.8	45.7	12.2	12.2
4/4/14 19:00	61.1	53.7	50.3	12.2	12.2
4/4/14 20:00	61.2	53.7	50.3	12.2	12.2
4/4/14 21:00	61.3	53.8	50.4	12.2	12.2

Calciner No. 3 (EP ID No. 203)

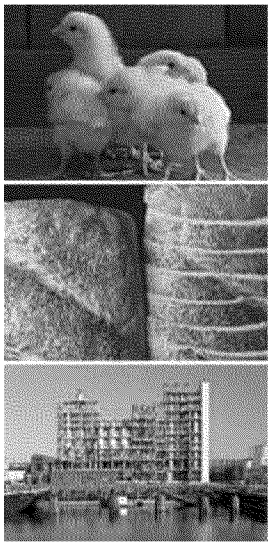
Time	Phosphate ore mass flow rate to the calciner	Beneficiated rock mass flow rate to the calciner	Product mass flow rate from the calciner	Phosphate ore moisture content	Beneficiated rock moisture content
	(tons/hr)	(tons/hr)	(tons/hr)	(%)	(%)
4/4/14 22:00	61.4	53.9	50.5	12.2	12.2
4/4/14 23:00	61.4	53.9	50.5	12.2	12.2
4/5/14 0:00	61.5	55.1	51.6	10.4	10.4
4/5/14 1:00	61.6	55.2	51.7	10.4	10.4
4/5/14 2:00	61.7	55.3	51.8	10.4	10.4
4/5/14 3:00	61.8	55.3	51.8	10.4	10.4
4/5/14 4:00	61.8	55.4	51.9	10.4	10.4
4/5/14 5:00	61.9	55.5	52.0	10.4	10.4
4/5/14 6:00	62.0	55.5	52.0	10.4	10.4
4/5/14 7:00	62.1	55.6	52.1	10.4	10.4
4/5/14 8:00	62.1	55.7	52.2	10.4	10.4
4/5/14 9:00	62.2	55.8	52.2	10.4	10.4
4/5/14 10:00	62.3	55.8	52.3	10.4	10.4
4/5/14 11:00	62.4	55.9	52.4	10.4	10.4
4/5/14 12:00	62.6	56.1	52.5	10.4	10.4
4/5/14 13:00	63.9	57.2	53.6	10.4	10.4
4/5/14 14:00	62.4	55.9	52.3	10.4	10.4
4/5/14 15:00	62.8	56.3	52.8	10.4	10.4
4/5/14 16:00	63.3	56.8	53.2	10.4	10.4
4/5/14 17:00	65.1	58.3	54.6	10.4	10.4
4/5/14 18:00	65.5	58.7	55.0	10.4	10.4
4/5/14 19:00	65.9	59.0	55.3	10.4	10.4
4/5/14 20:00	66.2	59.3	55.6	10.4	10.4
4/5/14 21:00	66.8	59.8	56.0	10.4	10.4
4/5/14 22:00	68.6	61.4	57.5	10.4	10.4
4/5/14 23:00	68.4	61.3	57.4	10.4	10.4
4/6/14 0:00	64.2	55.9	52.4	12.9	12.9
4/6/14 1:00	59.9	52.1	48.8	12.9	12.9
4/6/14 2:00	55.5	48.3	45.3	12.9	12.9
4/6/14 3:00	51.1	44.5	41.7	12.9	12.9
4/6/14 4:00	46.8	40.7	38.1	12.9	12.9
4/6/14 5:00	42.4	36.9	34.6	12.9	12.9
4/6/14 6:00	38.0	33.1	31.0	12.9	12.9
4/6/14 7:00	33.7	29.3	27.5	12.9	12.9
4/6/14 8:00	29.3	25.5	23.9	12.9	12.9
4/6/14 9:00	24.9	21.7	20.3	12.9	12.9
4/6/14 10:00	20.5	17.9	16.8	12.9	12.9
4/6/14 11:00	16.2	14.1	13.2	12.9	12.9
4/6/14 12:00	11.8	10.3	9.6	12.9	12.9

Date/Time	Raw Coal Bin Inventory	Silo Change	Railcar Tons Unloaded	Wet Coal Consumption	Calciner Total Production 65C	Wet Coal lb/Ton 65C	Coal Moisture	Method Tested
3/30/2014 0:00	901.7							
3/31/2014 0:00	755.7	146.0	0.0	146.0	7006	41.67	6.8	
4/1/2014 0:00	837.1	-81.4	306.8	225.3	8301	54.28	6.8	EPA Method 30b
4/2/2014 0:00	751.3	85.8	105.7	191.5	7080	54.09	6.8	EPA Method 30b
4/3/2014 0:00	595.3	156.0	0.0	156.0	7772	40.14	6.8	
4/4/2014 0:00	576.2	19.1	209.1	228.2	5487	83.18	6.8	EPA Method 320/13b
4/5/2014 0:00	824.4	-248.2	408.6	160.4	6172	51.96	6.8	
4/6/2014 0:00	638.3	186.2	0.0	186.2	8075	46.11	6.8	
4/7/2014 0:00	481.6	156.7	0.0	156.7	8745	35.83	6.8	
4/8/2014 0:00	322.6	159.0	0.0	159.0	7308	43.53	6.8	

REPORT

Attachment B, Original Petition

EPA INFORMATION COLLECTION REQUEST EMISSION TESTING PCS PHOSPHATE COMPANY, INC. – AURORA, NC





Prepared for:

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November 2010

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1.1 SUMMARY OF TEST PROGRAM

On April 3, 2010, the United States (US) Environmental Protection Agency (EPA) issued an Information Collection Request (ICR) to phosphoric acid and phosphate fertilizer manufacturing facilities (NAICS code 325312), including the PCS Phosphate Company Inc. (PCS Phosphate) Aurora, North Carolina (NC) facility. The ICR was received by PCS Phosphate on April 15, 2010. The PCS Phosphate facility located near Aurora, NC includes phosphate rock mining operations, as well as manufacturing of granular and liquid phosphate fertilizers, fertilizer grade phosphoric acid, technical and food-grade phosphoric acid, superphosphoric acid, and phosphate rock products. The ICR issued by EPA has two parts: a data survey and an emission testing requirement. This report describes the results of the testing completed to fulfill the requirements of the emissions testing requirement of the ICR for the Aurora facility.

Emission testing was performed for thirteen (13) sources. Table 1-1 presents the emission tests conducted for each source.

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Table 1-1 PCS Phosphate ICR Emission Test Matrix (Revised)

	Species:	Non-Mercury Metals	Hydrogen Fluoride	Total Fluoride	Hexavalent Chromium	Hg	Hg	MIBK	PM	$PM_{2.5}$ (condensable)
EP	**Emission Unit Description**	Method 29	Method 26A	Method 13B	SW-846 Method 0061	Method 30B	ASTM D6784-02 (Ontario Hydro)	Method 320	Method 5	OTM 28
EP-210	Rock Dryer	x	x	x	x	x	x		x	x
EP-203	Calciner 3	x	x	x	x	x	x		x	x
EP-701	DFP Kiln Stack	x	x	x	x	x	x		x	x
EP-403	PA-2 Belt Filter Scrubber Stack (amber acid)	x	x	[a]	x	x	x		x	x
EP-404	PA-2 Crossflow Scrubber Stack (amber acid)	x	x	[a]	x	x	x			x
EP-408	PA-4 Belt Filter Scrubber Stack (green acid)	x	x	[a]	x	x	x		x	x
EP-409	PA-4 Crossflow Scrubber Stack (green acid)	x	x	[a]	x	x	x		x	x
EP-331	SPA-2 Plant Scrubber Stack	x	x	[a]	x	[b]	[b]		x	x
EP-332	SPA-3&4 Plant Scrubber Stack	x	x	[a]	x	[b]	[b]		x	x
EP-303	DAP Plant No. 2	x	x	[a]	x	[b]	[b]		x	x
EP-302	MAP Plant No. 3	x	x	[a]	x	[b]	[b]		x	x
EP-502	PAP Scrubber Stack	x	[c]	x	x	[b]	[b]	x	x	x
EP-501	PAP Chiller Stack						[b]	x		

[a] Method 13B - Historical date collected previously by PCS will be used.

[b] Hg testing of downstream sources waived.

[c] HF by Method 320.

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2.1 SITE LOCATION

PCS Phosphate owns and operates a phosphate rock mining and phosphoric acid manufacturing facility located near Aurora, in Beaufort County, North Carolina. Beaufort County is located in the eastern coastal region of North Carolina. The facility falls under the standard North American Industry Classification System (NAICS) codes 212392 for phosphate rock mining and 325312 for phosphoric acid manufacturing.

2.2 OVERVIEW OF OPERATIONS

The PCS Phosphate Aurora facility mines phosphate rock and uses this raw material to produce granular and liquid phosphate fertilizers, fertilizer grade phosphoric acid, technical and food-grade phosphoric acid, superphosphoric acid, and phosphate rock products. The Aurora site mines and processes approximately 6 million tons per year (tpy) of phosphate rock. The site includes process operations that fall into two main categories: Mining and Mill operations and Mineral Processing operations. The following are the main process areas covered by the ICR request at the plant:

Mining and Mill Areas:

- Ore milling, calcination, drying, and grinding

Mineral Processing Areas:

- Sulfuric acid production
- Phosphoric acid production
- Fertilizer production
- Superphosphoric acid production
- Purified acid production
- Defluorinated feed phosphate
- Silicon tetrafluoride production

The main raw materials used at the Aurora site are mined phosphate rock, elemental sulfur, and anhydrous ammonia. Phosphate ore is mined in adjacent open-pit mines and transported in a water slurry in enclosed pipes to the mill area. Elemental sulfur is transported in railcars and barges to the Aurora site where it is steam heated and unloaded as molten sulfur. Anhydrous ammonia is transported to the site in railcars. Process flow diagrams for the individual process operations were included in the survey response submitted on August 12, 2010. The following presents a brief summary of the operations in each area.

2.2.1 Mining and Mill Area

Mined phosphate ore (14% P_2O_5) is beneficiated by screening, removal of clay, froth flotation, and flocculation to separate sand and other foreign material. The beneficiated rock is stored in a wet pile. The rock can then be transferred to the rock dryer to remove moisture prior to sale or

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further use in fertilizer production, or to the calciners prior to sending to the phosphoric acid plant to make green phosphoric acid, or directly to the phosphoric acid plant to make amber phosphoric acid. The following sections describe the process operations in the mill area covered by the ICR testing program.

2.2.1.1 Calcination

Beneficiated phosphate rock is received from wet rock storage via conveyors to calcination for removal of moisture and carbonaceous material. Six fluidized-bed calciners are fueled by bituminous coal/coke mixture (or No. 6 fuel oil or used oil as backup fuel) to maintain temperature necessary for oxidation of carbonaceous material in the fluidized bed. The calciners consist of a pre-heat section, fluidized bed calcination, and a cooling compartment for the calcined rock. The rock is cooled by direct water spray downstream of the calciners, discharged through a level control valve, and transferred to either storage silos or the phosphoric acid production area.

Vent streams from the preheat bed and the aftercooler chambers of each calciner exhaust through individual cyclones and a venturi scrubber, using water as the scrubbing solution. Each calciner is also equipped with a wet electrostatic precipitator (WESP) following the scrubber for additional emissions control. The calciners must meet Maximum Achievable Control Technology (MACT) requirements outlined in 40 CFR Subpart AA for Phosphoric Acid Manufacturing Plants.

2.2.1.2 Drying

A rock dryer removes moisture in the wet rock (downstream of mining and beneficiation) in a fluidized-bed dryer fueled by No. 6 fuel oil. Moisture content of the rock is decreased from approximately 10% moisture, down to less than 1% moisture. Dried phosphate rock can be used in the phosphoric acid production process or transferred to shipping for sale.

2.2.2 Sulfuric Acid Production

Sulfuric acid is used to react with phosphate rock to produce phosphoric acid. The sulfuric acid production area currently includes three sulfuric acid (SA) plants (SA Plant Nos. 5, 6, and 7), one cogeneration plant, and one auxiliary boiler.

All of the sulfuric acid plants use the double-absorption contact process to produce sulfuric acid, which consists of the following steps:

- Burn elemental sulfur in the presence of air to form sulfur dioxide (SO_2);
- Combine SO_2 with oxygen (O_2) in the presence of a catalyst to produce sulfur trioxide (SO_3); and
- Absorb SO_3 in the sulfuric acid (H_2SO_4) to which water is added to dilute the acid to 96%.

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Testing of the sulfuric acid production portion of the Aurora plant was not part of the ICR Emission Testing program.

2.2.3 Phosphoric Acid Production

The Aurora site produces phosphoric acid in four trains using the wet process. The phosphoric acid is used internally to produce fertilizers, superphosphoric acid, and purified (food-grade) phosphoric acid. Acid not consumed internally is sold and shipped off site via truck, railcar or barge. Two types of phosphoric acids are produced: "green" acid (from calcined rock) and "amber" acid (from uncalcined rock).

The four phosphoric acid trains are similar in design. Production of phosphoric acid by the wet process involves three unit operations: phosphate rock digestion, filtration, and concentration. Digestion occurs in the attack vessel, or acidulator, where phosphate rock and sulfuric acid are added to a recirculatory acid slurry. Because the acidulation reaction is exothermic, the hot slurry must be cooled to reduce/prevent scaling during filtration. Vapors from the flash cooler are condensed and sent to a hot well. Emissions from the reactors and associated equipment from each train are exhausted through a spray-crossflow packed bed scrubber. There are four scrubbers, one per train.

The P_2O_5 concentration of the phosphoric acid is about 26 percent when it processed through tilting pan and belt filters. Acid from the filtration step is sent to vacuum receivers and then to filtrate pumps or filtrate seal tanks and then to storage tanks for solids settling. Emissions from the belt filters and belt filter seal tanks are controlled by two cyclonic wet scrubbers, one for Trains No. 1 and No. 2 and the second for Trains No. 3 and No. 4.

The ICR testing program included the cyclonic and crossflow scrubbers for the PA-2 plant producing amber acid, and the cyclonic and crossflow scrubbers for the PA-4 plant producing green acid.

2.2.4 Fertilizer Production

In the fertilizer production area, PCS Phosphate manufactures granular and liquid phosphate fertilizer products. The area includes three separate fertilizer plants, of which the Diammonium Phosphate Plant No. 2 and Monoammonium Plant No. 3 were selected for the ICR testing.

2.2.4.1 DAP No. 2 Plant

The ammoniated phosphates are produced by reacting anhydrous ammonia with a blend of various types and grades of phosphoric acid. This reaction takes place in two steps. The initial reaction occurs in the reactor tank. The final reaction occurs in the granulator drum.

The purpose of the granulator is to mix the ammoniated slurry and phosphoric acid with the dry recycle to form granules and complete the reaction. The granulated product is dried in a dryer, screened to separate product sized granules, and cooled. Coating oil is added to the product in the cooler as a dust suppressant prior to shipment or storage. Oversized granules are ground in enclosed mills and recycled to the granulator along with the undersized granules.

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The process generates product- and reactant-bearing off-gases. Product dust is recovered in three cyclones: one on the discharge stream of the dryer, another on the discharge stream from the cooler and the third on certain materials handling equipment. Three venturi scrubbers, using an ammoniated phosphate solution and/or water as a scrubbing medium, remove additional product dust from the cyclone exhausts and recover ammonia and some fluorides in the off-gas from the reactor and granulator. The venturi scrubbers exhaust to two packed bed scrubbers for final control of dust, ammonia, and fluoride emissions. Both packed bed scrubbers exhaust to a common stack (ID No. 303).

2.2.4.2 MAP No. 3 Plant

MAP No. 3 Plant has been configured to produce MAP since 1986, and permitted to produce DAP since 1992. The plant produced MAP for the tests conducted under the ICR program. The MAP and DAP processes in this plant are similar to those described above for the DAP No. 2 Plant, except that DAP No. 3 utilizes a pipe reactor versus a tank reactor for the initial reaction of ammonia and phosphoric acid.

The slurry is sprayed into a granulator vessel where it is mixed with a recycled product stream in a rotating cylindrical vessel to produce a granular product. The granular product is then dried in the dryer, screened, cooled, and sprayed with a light oil prior to shipment or storage. Oversize granules are ground in enclosed chain mills prior to being recycled to the granulator along with undersize granules.

The processes described above generate product-be aring off gases. Product dust is collected in cyclones and returned to the process. The exhaust gas from the cyclones, along with fumes and dust from the reactors and granulator are controlled by scrubbers. The exhaust from the four primary scrubbers is combined prior to passing through the tail gas scrubber, which uses a scrubber liquor consisting of fresh water or tail gas scrubber water from the DAP No. 2 Plant. The tail gas scrubber exhausts to a single stack (ID No. 302).

2.2.5 Superphosphoric Acid Production

In the superphosphoric acid production area, PCS Phosphate operates four superphosphoric acid plants. The superphosphoric acid (SPA) production process concentrates various grades of phosphoric acid by removing water. SPA plants 1 and 2 have two stage, falling film evaporators that can operate in parallel, series , or stand alone. SPA plants 3 and 4 have forced circulation, single stage evaporators. SPA plants 1 and 2 each have a venturi scrubber that controls fluoride emissions from the product storage tank and evaporator hotwell and discharges through stack IDs 330 and 331, respectively. SPA plants 3 and 4 share a common venturi scrubber that controls fluoride emissions from the product storage tanks and evaporator hotwells and discharges through stack ID 332. The scrubber stacks for SPA-2 and SPA-3&4 were tested as part of the ICR program.

2.2.6 Purified Acid Production

The purified acid production area consists of four production trains in Purified Acid Plants No. 1 and 2. PAP No. 1 and PAP No. 2 purify phosphoric acid by solvent extraction to produce (1) low-alkali, high-purity phosphoric acid suitable for use in technical and food grade

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manufacturing; (2) high-alkali phosphoric acid suitable for manufacturing technical grade derivatives; and (3) raffinate which contains constituents removed during the production of the first two products and is used in manufacturing fertilizers at the Aurora site. The PAP plants have an approximate maximum design capacity of 1,200 tons P_2O_5 feed per day each.

In the PAP plants, phosphoric acid is mixed with a solvent in two extraction columns which are operated in parallel. In the extraction columns, the phosphoric acid preferentially dissolves in the solvent forming an extract of phosphoric acid and solvent, which is recovered as a stream, and leaving a portion of phosphoric acid, water, and certain constituents from the solvent process as raffinate, which is also recovered as a stream. The phosphoric acid-solvent extract streams enter two release columns which are also operated in parallel. A stream of purified, low-alkali phosphoric acid is recovered from near the middle of each release column; a stream of purified, high-alkali phosphoric acid is recovered from near the bottom of each column.

The high-alkali acid streams from the release columns of the PAP plants are passed through stream strippers where residual solvent is removed and recycled to a solvent storage tank. The two acid streams are evaporated to a 57-63 percent P_2O_5 concentration, defluorinated, and stored until shipment.

The solvent-laden storage tanks and process vessels are kept under a nitrogen blanket system that vents to a chilled stack that condenses the solvent for reuse. Spray tower scrubbers control the fluoride emissions from the concentrators and defluorination columns in the low alkali acid and high alkali acid streams. The scrubber and chiller stacks for PAP-2 were tested as part of the ICR program.

2.2.7 Defluorinated Feed Phosphate Production

Defluorinated phosphate (DFP) is a sodium modified tri-calcium phosphate mineral used in poultry feeds. The production of DFP utilizes three primary raw materials: phosphate rock, phosphoric acid, and soda ash.

The three raw materials are blended in a pug mill. Emissions from the pug mill are controlled by a high-efficiency limestone wet scrubbing system. Blended feed is transferred directly to a rotary defluorination kiln, where heat from combustion of pulverized coal is used to defluorinate phosphate rock. Exhaust from the kiln is controlled by a wet limestone scrubbing system. Emissions from the DFP kiln stack was tested as part of the ICR testing program.

In the kiln, the mixed feed undergoes a chemical transformation. Organics, sulfates, carbonates, and fluorides are removed. In addition, the calcium phosphates and sodium form a solid known as rhenonite. After the passing through a product cooler for energy recovery, the clinker from the kiln is transported to a crushing and screening circuit. Finished DFP is conveyed to the product storage facilities.

2.3 SAMPLING LOCATIONS

2.3.1 Air Emissions Sampling Locations

Sampling locations for the thirteen emission points are outlined in Table 1-1. As directed in the ICR letter, locations and numbers of traverse points met the specifications of EPA Method 1

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(reference Appendix A to 40 CFR Part 60). Figures 2-1 through 2-9 present the stack configurations for the individual sources tested. The SPA-2 test location was tested on single traverse during isokinectic sampling due to limited port size and access. A full velocity traverse was made prior to and after the sampling run.

Figure 2-1. Calciner #3 (EP-203)

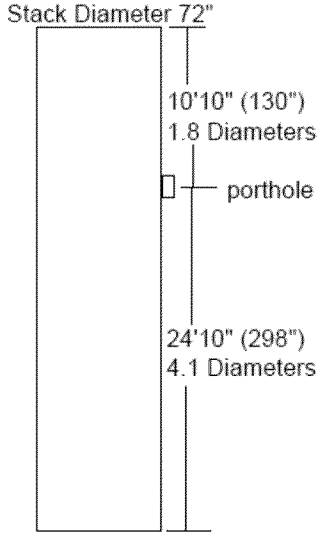
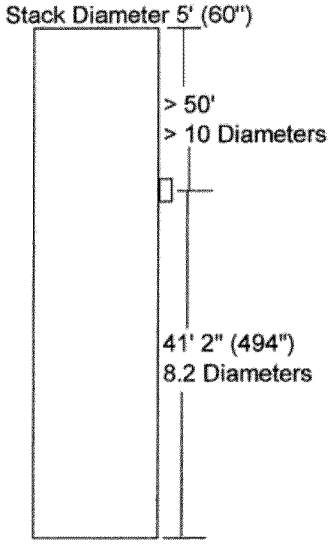


Figure 2-2. DFP Kiln (EP-701)



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Figure 2-3. PA2Crossflow Scrubber (EP-404)

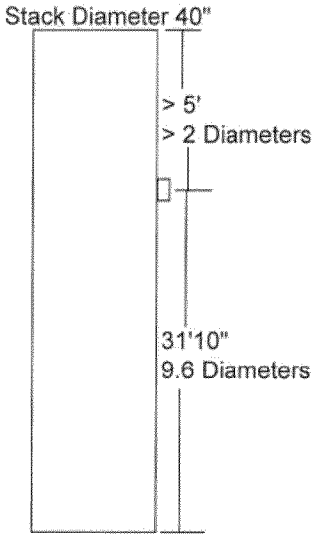
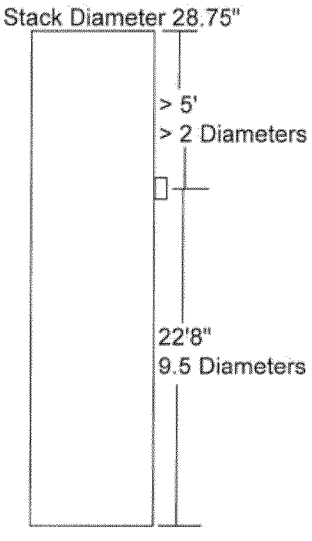


Figure 2-4. PA2 Cyclonic Scrubber (EP-403)



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Figure 2-5. PA4 Crossflow Scrubber (EP-409)

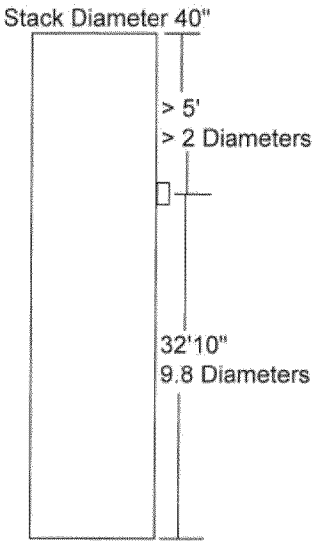
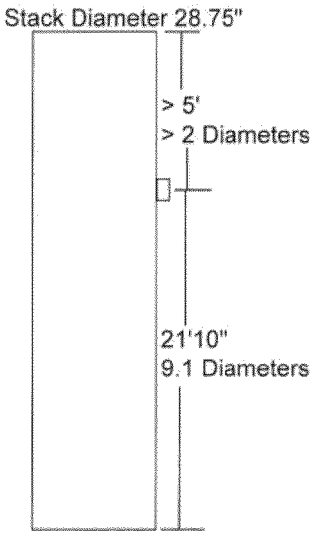


Figure 2-6. PA4 Cyclonic Scrubber (EP-408)



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Figure 2-7. DAP #2 (EP-303)

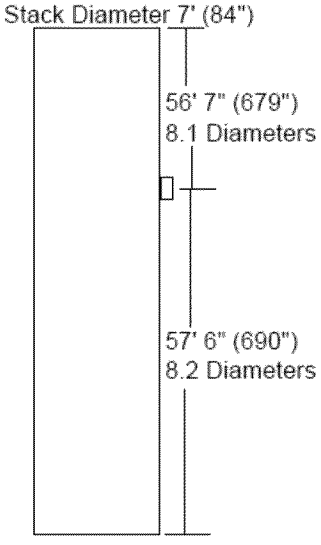
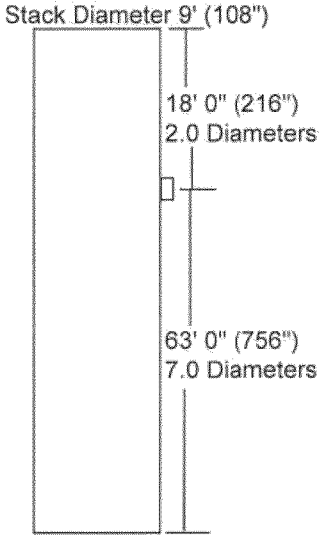


Figure 2-8. DAP/MAP #3 (EP-302)



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Figure 2-9. Superphosphoric Acid Plant #2 (EP-331)

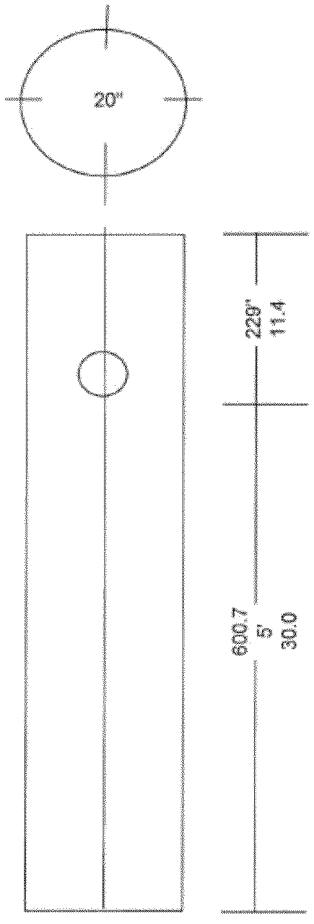
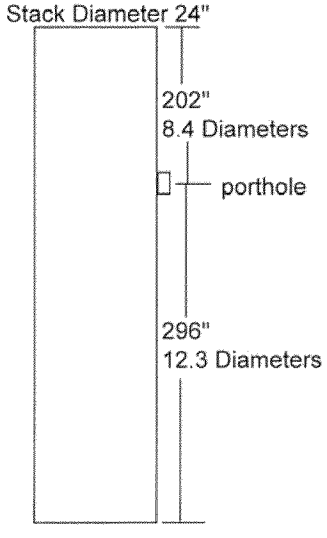


Figure 2-10. Superphosphoric Acid Plant #3/4 (EP-332)



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Figure 2-11. PAP Chiller Stack (EP-501)

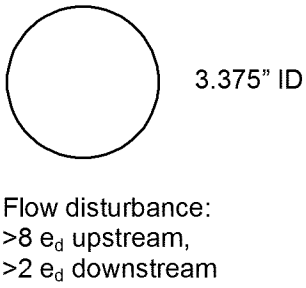


Figure 2-12. PAP Scrubber Stack (EP-502)

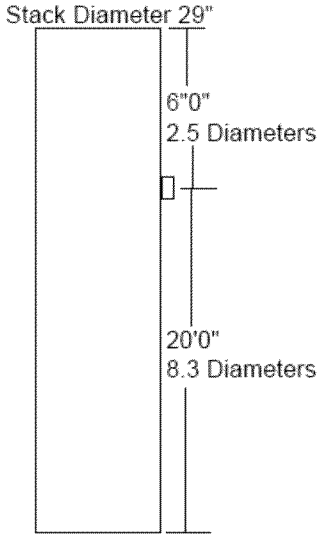


Figure 2-13. Rock Dryer (EP-210) (to be submitted separately)

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2.3.2 Solid Sampling Locations

Solid material analysis was requested for facilities that operate a phosphate rock beneficiation, phosphoric acid manufacturing and/or phosphate fertilizer production facility. The following solids were identified for analysis: ore from the mine; beneficiated phosphate rock to the dryer and calciner; post dried and calcined phosphate rock; and phosphogypsum from the active stack. PCS Phosphate identified and recorded the date, time and location of all process samples collected for the program.

2.3.3 Liquid Sampling Locations

Samples from wet scrubbers upstream of the air emissions sampling points were taken during the testing in order to determine mercury, total suspended solids (TSS), and total dissolved solids (TDS) in the scrubbing liquor. Liquid samples were taken from the scrubber vessel sump or recirculation line during the time of testing for this purpose. Three samples were collected during the prescribed test method and analyzed. PCS Phosphate process operation personnel collected the liquid samples. The TSS and TDS water sample analysis was conducted on site by the PCS Environmental Laboratory. The water samples for mercury (Hg) analysis were analyzed by Columbia Analytical Service.

The analytical results for TSS and TDS and scrubber liquid recirculation rates are present in Tables 2-1 through 2-11 for each source tested during the ICR program. These water samples were collected during the corresponding Method 5 /OTM-28 test runs. The scrubber water TSS and TDS sample analysis was conducted by the PCS Phosphate Aurora Environmental Lab.

Table 2-1. TDS TSS Results Summary - Calciner 3 (EP-203)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
Cal -3	1	7,400	21,130	1,042
Cal -3	2	7,076	31,160	1,007
Cal -3	3	7,190	31,380	1,008
Cal -3	Average	7,222	27,890	1,019

Table 2-2. TDS TSS Results Summary - DFP Kiln (EP-701)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
DFP	2	7,440	41,820	22,414
DFP	3	7,180	62,020	22,349
DFP	4	10,375	40,160	22,324
DFP	Average	8,332	48,000	22,362

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Table 2-3. TDS TSS Results Summary - PA2 Crossflow Scrubber (EP-404)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
PA2 Xflow	1	45,040	29.4	3,530
PA2 Xflow	2	45,360	40.2	3,390
PA2 Xflow	3	46,400	59.2	3,199
PA2 Xflow	Average	45,600	42.9	3,373

Table 2-4. TDS TSS Results Summary - PA2 Cyclonic Scrubber (EP-403)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
PA2-Cyclonic	1	45,360	128.0	247
PA2-Cyclonic	2	45,980	67.6	241
PA2-Cyclonic	3	45,390	46.6	241
PA2-Cyclonic	Average	45,577	80.7	243

Table 2-5. TDS TSS Results Summary - PA4 Crossflow Scrubber (EP-409)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
PA4 -Xflow	1	50,050	36.6	3,485
PA4-Xflow	2	49,550	31.6	3,547
PA4 -Xflow	3	50,000	40.8	3,123
PA4-Xflow	Average	49,867	36.3	3,385

Table 2-6. TDS TSS Results Summary - PA4 Cyclonic Scrubber (EP-408)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
PA4-Cyclonic	1	51,550	33.6	252
PA4-Cyclonic	2	52,100	50.8	262
PA4-Cyclonic	3	51,775	47.6	262
PA4-Cyclonic	Average	51,808	44.0	259

Table 2-7. TDS TSS Results Summary - SPA-2 (EP-331)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
SPA 2	1	ND	ND	512
SPA 2	2	ND	ND	505
SPA 2	3	ND	ND	501
SPA 2	Average	ND	ND	506

Table 2-8. TDS TSS Results Summary - SPA-3/4 (EP-332)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
SPA 3/4	1	ND	ND	524
SPA 3/4	2	ND	ND	528
SPA 3/4	3	ND	ND	526
SPA 3/4	Average	ND	ND	526

Table 2-9. TDS TSS Results Summary - DAP-2 (EP-303)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
DAP-2	1	30,180	2,060	13,695
DAP-2	2	30,860	4,530	13,687
DAP-2	3	33,040	2,690	13,707
DAP-2	Average	31,360	3,093	13,696

Table 2-10. TDS TSS Results Summary - MAP-3 (EP-302)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
MAP-3	1	95,160	29,910	5,734
MAP-3	2	96,040	35,660	5,748
MAP-3	3	20,020	40,650	5,726
MAP-3	Average	70,407	35,407	5,736

Table 2-11. TDS TSS Results Summary - PAP Scrubbers (EP-502)

Sample ID	Run #	Total Dissolved Solids (TDS) (Mg/L)	Total Suspended Solids (TSS) (Mg/L)	Scrubber Liquid Flowrate (lpm)
PAP	1	24,550	12.0	10,364
PAP	2	25,800	13.0	10,295
PAP	3	25,460	13.2	10,198
PAP	Average	25,270	12.7	10,286

The Hg water sample analytical results and scrubber liquid recirculation rates are presented in Tables 2-12 through 2-18.

Table 2-12. Method 1631 Hg Analysis - Calciner 3 (EP-203)

Sample ID	Run #	Hg Method 1631 [a] (ng/L)	Analytical Flag	Hg Method 1631 [b] (ng/g)	Analytical Flag	Scrubber Liquid Flowrate [c] (lpm)
Cal -3 Slurry	1	0.52	BDL	243	ADL	924
Cal -3 Slurry	2	0.88	BDL	273	ADL	
Cal -3 Slurry	3	0.61	BDL	241	ADL	
Cal -3 Slurry	Average	0.67		252		

[a] Liquid fraction of sample

[b] Solid fraction of sample

[c] 4-hour average during Hg testing

Table 2-13. Method 1631 Hg Analysis - DFP Kiln (EP-701)

Sample ID	Run #	Hg Method 1631 [a] (ng/L)	Analytical Flag	Hg Method 1631 [b] (ng/g)	Analytical Flag	Scrubber Liquid Flowrate [c] (lpm)
DFP Scrubber	1	3.84	ADL	5.3	ADL	22,113
DFP Scrubber	2	4.06	ADL	25.7	ADL	
DFP Scrubber	3	10.2	ADL	22.1	ADL	
DFP Scrubber	Average	6.03		17.7		

[a] Liquid fraction of sample

[b] Solid fraction of sample

[c] 4-hour average during Hg testing

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Table 2-14. Method 1631 Hg Analysis - PA2 Crossflow Scrubber (EP-404)

Sample ID	Run #	Hg Method 1631 [a] (ng/L)	Analytical Flag	Hg Method 1631 [b] (ng/g)	Analytical Flag	Scrubber Liquid Flowrate [c] (lpm)
PA2Xflow	1	1.03	ADL	0.4	BDL	3,135
PA2Xflow	2	0.70	BDL	0.6	BDL	
PA2Xflow	3	1.49	ADL	0.6	BDL	
PA2Xflow	Average	1.07		0.5		

[a] Liquid fraction of sample

[b] Solid fraction of sample

[c] 4-hour average during Hg testing

Table 2-15. Method 1631 Hg Analysis - PA2 Cyclonic Scrubber (EP-403)

Sample ID	Run #	Hg Method 1631 [a] (ng/L)	Analytical Flag	Hg Method 1631 [b] (ng/g)	Analytical Flag	Scrubber Liquid Flowrate [c] (lpm)
PA2 Cyclonic	1	1.83	ADL	0.7	BDL	285
PA2 Cyclonic	2	6.69	ADL	1.3	ADL	
PA2 Cyclonic	3	1.31	ADL	0.7	BDL	
PA2 Cyclonic	Average	3.28		0.9		

[a] Liquid fraction of sample

[b] Solid fraction of sample

[c] 4-hour average during Hg testing

Table 2-16. Method 1631 Hg Analysis - PA4 Crossflow Scrubber (EP-409)

Sample ID	Run #	Hg Method 1631 [a] (ng/L)	Analytical Flag	Hg Method 1631 [b] (ng/g)	Analytical Flag	Scrubber Liquid Flowrate [c] (lpm)
PA4 Xflow	1	1.57	ADL	0.6	BDL	3,326
PA4 Xflow	2	0.90	BDL	0.5	BDL	
PA4 Xflow	3	0.98	BDL	0.4	BDL	
PA4 Xflow	Average	1.15		0.5		

[a] Liquid fraction of sample

[b] Solid fraction of sample

[c] 4-hour average during Hg testing

Table 2-17. Method 1631 Hg Analysis - PA4 Cyclonic Scrubber (EP-408)

Sample ID	Run #	Hg Method 1631 [a] (ng/L)	Analytical Flag	Hg Method 1631 [b] (ng/g)	Analytical Flag	Scrubber Liquid Flowrate [c] (lpm)
PA4-Cyclonic	1	0.63	BDL	1.1	ADL	260
PA4-Cyclonic	2	1.03	ADL	0.7	BDL	
PA4-Cyclonic	3	0.81	BDL	1.7	ADL	
PA4-Cyclonic	Average	0.82		1.2		

[a] Liquid fraction of sample

[b] Solid fraction of sample

[c] 4-hour average during Hg testing

Table 2-18. Method 1631 Hg Analysis - Rock Dryer (EP-210)

(to be submitted separately)

2.4 PROCESS OPERATING DATA

Testing was conducted under normal operating conditions throughout the testing periods. Process data during the emission testing as requested in the ICR Enclosure 2 (Table 1.3) request is presented in Appendix C.

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The ICR emission testing at PCS Phosphate Aurora was conducted between June 1 and October 22, 2010. The emission test results of 12 of the 13 sources are presented in this report. The completion of the emission testing on the rock dryer was delayed till late October due to limited operation. The test results of the rock dryer will be presented separately after completion of the analysis.

The URS test team conducted the EPA requested ICR emission testing under representative conditions according to the test methods identified in the Enclosure 2 and subsequent guidance as provided on the website guidance and communications with EPA representatives. The average test result by method and parameter are summarized in Table 3-1 through 3-13 for each emission source. Individual test runs for each test method are contained in Appendix A.

The supporting analytical data for each test method is contained in Appendix B.

Table 3-1. Test Result Summary – Calciner 3 (EP-203)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	4.67E-03	gr/dscf @ 3% O_2
EPA Method OTM-28	Condensible PM	4.98E-03	
EPA Method 29	Antimony	1.02E-07	gr/dscf @ 3% O_2
	Arsenic	2.03E-07	
	Beryllium	2.72E-08	
	Cadmium	6.51E-06	
	Chromium	4.43E-06	
	Cobalt	2.00E-07	
	Lead	3.29E-06	
	Manganese	1.01E-06	
	Nickel	3.54E-06	
	Phosphorus	1.37E-03	
	Selenium	3.20E-07	
SW-846 Method 0061	$Chromium^{+6}$	2.85E-07	gr/dscf @ 3% O_2
ASTM D6784-02 (Ontario Hydro)	Total Mercury	5.77E-05	gr/dscf @ 3% O_2
EPA Method 30B	Total Mercury	4.34E-05	gr/dscf @ 3% O_2
EPA Method 26A	Hydrogen Fluoride	1.30E+00	ppmvd @ 3% O_2
EPA Method 13B	Total Fluoride	3.12E-04	gr/dscf @ 3% O_2
		9.03E-01	ppmvd @ 3% O_2

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Table 3-2. Test Result Summary - DFP Kiln (EP-701)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	2.88E-02	gr/dscf @ 3% O_2
EPA Method OTM-28	Condensible PM	2.70E-02	
EPA Method 29	Antimony	4.66E-06	gr/dscf @ 3% O_2
	Arsenic	2.11E-05	
	Beryllium	8.17E-07	
	Cadmium	3.17E-04	
	Chromium	4.48E-04	
	Cobalt	9.09E-07	
	Lead	1.08E-05	
	Manganese	2.07E-06	
	Nickel	3.78E-06	
	Phosphorus	1.56E-03	
	Selenium	2.37E-05	
SW-846 Method 0061	$Chromium^{+6}$	1.53E-06	gr/dscf @ 3% O_2
ASTM D6784-02 (Ontario Hydro)	Total Mercury	1.93E-05	gr/dscf @ 3% O_2
EPA Method 30B	Total Mercury	1.58E-05	gr/dscf @ 3% O_2
EPA Method 26A[a]	Hydrogen Fluoride	2.57E+00	ppmvd @ 3% O_2
EPA Method 13B[a]	Total Fluoride	4.40E-03	gr/dscf @ 3% O_2
		1.27E+01	ppmvd @ 3% O_2

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

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Table 3-3. Test Result Summary PA2 Crossflow Scrubber (EP-404)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	1.39E-03	gr/dscf
EPA Method OTM-28	Condensible PM	1.75E-03	
EPA Method 29	Antimony	1.28E-08	gr/dscf
	Arsenic	2.65E-08	
	Beryllium	3.55E-09	
	Cadmium	1.76E-07	
	Chromium	7.27E-07	
	Cobalt	3.56E-08	
	Lead	4.17E-07	
	Manganese	4.67E-07	
	Nickel	7.76E-07	
	Phosphorus	1.02E-04	
	Selenium	2.03E-07	
SW-846 Method 0061	$Chromium^{+6}$	1.93E-08	gr/dscf
ASTM D6784-02 (Ontario Hydro)	Total Mercury	1.88E-08	gr/dscf
EPA Method 30B	Total Mercury	1.48E-08	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	4.40E+00	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

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Table 3-4. Test Results Summary - PA2 Cyclonic Scrubber (EP-403)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	5.47E-04	gr/dscf
EPA Method OTM-28	Condensible PM	1.64E-03	
EPA Method 29	Antimony	3.89E-09	gr/dscf
	Arsenic	1.19E-08	
	Beryllium	2.77E-09	
	Cadmium	7.44E-08	
	Chromium	6.36E-07	
	Cobalt	4.43E-08	
	Lead	1.72E-07	
	Manganese	4.33E-07	
	Nickel	9.67E-07	
	Phosphorus	5.27E-05	
	Selenium	6.07E-08	
SW-846 Method 0061	$Chromium^{+6}$	2.92E-07	gr/dscf
ASTM D6784-02 (Ontario Hydro)	Total Mercury	2.14E-08	gr/dscf
EPA Method 30B	Total Mercury	2.16E-08	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	2.17E+00	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

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Table 3-5. Test Results Summary - PA4 Crossflow Scrubber (EP-409)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	2.00E-01	gr/dscf
EPA Method OTM-28	Condensible PM	2.39E-01	
EPA Method 29	Antimony	7.12E-09	gr/dscf
	Arsenic	4.33E-08	
	Beryllium	3.29E-09	
	Cadmium	1.69E-07	
	Chromium	1.67E-06	
	Cobalt	4.22E-08	
	Lead	1.58E-07	
	Manganese	3.98E-07	
	Nickel	1.20E-06	
	Phosphorus	1.07E-04	
	Selenium	1.25E-07	
SW-846 Method 0061	$Chromium^{+6}$	3.97E-08	gr/dscf
ASTM D6784-02 (Ontario Hydro)	Total Mercury	2.41E-08	gr/dscf
EPA Method 30B	Total Mercury	4.24E-08	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	2.66E+00	ppmvd

[a] Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

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Table 3-6. Test Results Summary - PA4 Cyclonic Scrubber (EP-408)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	6.09E-04	gr/dscf
EPA Method OTM-28	Condensible PM	7.50E-04	
EPA Method 29	Antimony	4.95E-09	gr/dscf
	Arsenic	2.47E-08	
	Beryllium	3.25E-09	
	Cadmium	6.69E-08	
	Chromium	7.37E-07	
	Cobalt	6.13E-08	
	Lead	9.31E-08	
	Manganese	6.76E-07	
	Nickel	1.12E-06	
	Phosphorus	5.63E-05	
	Selenium	7.01E-08	
SW-846 Method 0061	$Chromium^{+6}$	4.15E-07	gr/dscf
ASTM D6784-02 (Ontario Hydro)	Total Mercury	8.24E-09	gr/dscf
EPA Method 30B	Total Mercury	1.48E-08	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	6.20E+00	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

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Table 3-7. Test Results Summary - SPA-2 (EP-331)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	2.48E-03	gr/dscf
EPA Method OTM-28	Condensible PM	9.04E-04	
EPA Method 29	Antimony	1.30E-08	gr/dscf
	Arsenic	2.54E-08	
	Beryllium	2.53E-08	
	Cadmium	2.84E-07	
	Chromium	1.46E-06	
	Cobalt	2.73E-08	
	Lead	5.96E-08	
	Manganese	5.74E-07	
	Nickel	6.05E-07	
	Phosphorus	1.11E-03	
	Selenium	6.09E-08	
SW-846 Method 0061	$Chromium^{+6}$	2.33E-07	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	1.55E+00	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

Table 3-8. Test Results Summary of SPA-3/4 (EP-332)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	3.89E-03	gr/dscf
EPA Method OTM-28	Condensible PM	1.43E-03	
EPA Method 29	Antimony	1.35E-08	gr/dscf
	Arsenic	2.97E-08	
	Beryllium	1.19E-08	
	Cadmium	1.49E-07	
	Chromium	1.15E-06	
	Cobalt	2.55E-08	
	Lead	1.24E-07	
	Manganese	5.21E-07	
	Nickel	1.83E-06	
	Phosphorus	4.93E-04	
	Selenium	8.40E-08	
SW-846 Method 0061	$Chromium^{+6}$	1.45E-07	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	5.50E+00	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

Table 3-9. Test Results Summary -DAP-2 (EP-303)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	6.04E-03	gr/dscf
EPA Method OTM-28	Condensible PM	3.72E-03	
EPA Method 29	Antimony	1.99E-08	gr/dscf
	Arsenic	7.12E-08	
	Beryllium	9.62E-09	
	Cadmium	2.57E-06	
	Chromium	1.91E-06	
	Cobalt	3.46E-06	
	Lead	3.81E-07	
	Manganese	1.17E-06	
	Nickel	1.24E-05	
	Phosphorus	3.17E-04	
	Selenium	1.70E-07	
SW-846 Method 0061	Chromium^{+6}	6.08E-07	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	5.98E+00[b]	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

[b]PCS Phosphate operations personnel and management have reviewed the operating parameters of the DAP2 plant during Method 26A ICR testing on July 9, 12, and 13, 2010. Based on this evaluation, it is apparent that the operating conditions and test results for the first run (07/09/2010) were not representative of normal operations. The conclusion of this evaluation indicates that the results of the first run should not be included in the report.

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Table 3-10. Test Result Summary - MAP-3 (EP-302)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	1.78E-03	gr/dscf
EPA Method OTM-28	Condensible PM	1.72E-03	
EPA Method 29	Antimony	3.94E-08	gr/dscf
	Arsenic	7.44E-08	
	Beryllium	1.29E-08	
	Cadmium	2.14E-07	
	Chromium	1.46E-06	
	Cobalt	1.42E-07	
	Lead	5.45E-07	
	Manganese	4.45E-07	
	Nickel	6.80E-06	
	Phosphorus	4.44E-04	
	Selenium	7.70E-08	
SW-846 Method 0061	$Chromium^{+6}$	4.04E-07	gr/dscf
EPA Method 26A[a]	Hydrogen Fluoride	2.22E-01	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

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Table 3-11. Test Result Summary PAP Scrubbers (EP-502)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 5	Filterable PM	4.87E-04	gr/dscf
EPA Method OTM-28	Condensible PM	5.80E-04	
EPA Method 29	Antimony	4.56E-09	gr/dscf
	Arsenic	1.85E-08	
	Beryllium	2.89E-09	
	Cadmium	7.77E-08	
	Chromium	4.32E-07	
	Cobalt	1.82E-08	
	Lead	3.31E-07	
	Manganese	2.84E-07	
	Nickel	5.25E-07	
	Phosphorus	2.57E-05	
	Selenium	6.26E-08	
SW-846 Method 0061	$Chromium^{+6}$	2.72E-07	gr/dscf
EPA Method 320	MIBK	1.47E+00	ppmvd
	Hydrogen Fluoride	Not Detected	ppmvd
EPA Method 13B[a]	Total Fluoride	5.92E-04	gr/dscf
		1.71E+00	ppmvd

[a]Wet process phosphoric acid contains fluosilicic acid produced during the reaction of sulfuric acid and phosphate rock (fluorapatite). The two fluoride compounds in the vapor phase over fluosilicic acid are HF and SiF_4. When measuring fluoride content of these vapors, it is important to note that a total fluoride result will represent both fluoride present as HF and fluoride present as SiF_6.

Table 3-12 Test Results Summary PAP Chiller Stack (EP-501)

Test Method	Target Analyte	Average Test Result	Units
EPA Method 320	MIBK	5.78E+03	ppmvd
	Hydrogen Fluoride	Not Detected	ppmvd

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Table 3-13 Test Results Summary Rock Dryer (EP-210)

(To be submitted separately)

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The following sections present information on the test methods used for the test program.

4.1 VOLUMETRIC FLOW, MOISTURE, AND MOLECULAR WEIGHT

EPA Reference Methods 1, 2, 3, and 4 were used to determine the sample traverse point locations, volumetric flow, flue gas molecular weight, and the gas moisture content. Vent gas velocity and moisture content were measured at the stack location in conjunction with isokinetic sampling trains. Flue gas molecular weight was calculated using EPA Method 3A/3B to determine concentrations of O_2 and CO_2 in the stack gas.

4.2 PARTICULATE MATTER

The particulate matter (PM) was determined for both the filterable (front half) and back half (condensable) particulate matter fractions for the test program. Because the stack flue gas characteristics after the wet scrubber are such that the presence of entrained water droplets exist, the PM-2.5 (condensable) concentrations were determined using EPA Method 5 in combination with Other Test Method (OTM) 028.

A measured volume of stack gas was drawn from the stack isokinetically through a button hook style glass nozzle followed by a heated quartz filter. The remaining sample gas passed through a heated transfer line followed by a vertical water-jacketed condensing coil before entering the impinger train. The front half of the impinger train consisted of an oversized short stem impinger followed by a standard modified impinger. The two parts of the impinger train were connected with an in-train Teflon membrane filter. The sample gas passing through the filter was monitored and maintained at just below 85 °F by controlling the temperature of the front half water bath surrounding the impingers. The back half of the impinger train consisted of two standard size modified Greenberg-Smith impingers, the first of which contained 100 ml of organic free water with the final impinger containing silica gel. The back half of the sampling train was immersed in an ice bath to maintain the exit temperature to below 68 °F. After exiting the impinger train, the dry gas was measured using a dry gas metering console.

Particulate matter trapped in the heated probe and filter assembly was recovered by brushing and rinsing each fraction individually with acetone into separately labeled sample. Front half rinse samples were dried, desiccated for 24 hours, and analyzed gravimetrically at the Enthalphy Analytical in Durham, NC. The glass fiber filter was also desiccated, and the weight gain was added to the rinse weight.

The back half of the sampling train, including the heated transfer line and condensing coil, was rinsed with high purity organic free water, high purity acetone, and high purity methylene chloride (MeCl) to recover any condensable matter that may have accumulated during the test run. The impinger train was sealed and transported to the mobile laboratory where it was purged with nitrogen at 20 lpm for one hour before being recovered and extracted with high purity organic free water, high purity acetone, and high purity MeCl to remove and preserve the condensable particulate for evaporation and gravimetric analysis at the laboratory. Rinses were kept separate from the condensed moisture fraction until combined by the laboratory. (Note: During the course of the sampling campaign, the extraction solvent was changed from MeCl to hexane to conform with a facility wide ban on the use of MeCl.)

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Moisture in the gas streams was determined using EPA Method 4. In this method, the weight gain in the chilled impingers is used to calculate the percentage of moisture in the stack gas sample.

Molecular weight, carbon dioxide, and oxygen content of the gas samples were determined using EPA Method 3A/ 3B.

Stack gas velocity and volumetric flow rate were determined using EPA Method 2. In this method, a Type S pitot is used to traverse the duct using traverse points determined by EPA Method 1. The pitot pressures and temperature data collected during each sampling traverse are used to calculate the stack gas velocity.

Samples were all given a unique identification code and logged as they were collected and recovered. Identification codes were included on the sample containers during the analytical process. All EPA Method 5 samples were analyzed at Enthalpy Analytical of Durham, North Carolina. Enthalpy also performed the EPA Method OTM-028 analysis. Appendix B-1 contains the analytical data sheets and laboratory reports from Enthalpy Analytical.

4.3 HYDROGEN FLUORIDE - METHOD 26A

EPA Method 26A was used to determine emissions of HF in the gas stream. A sample of the stack gas was extracted from the test location through a glass nozzle, heated probe, and filter assembly prior to entering the sample train. The sample was filtered through a Teflon filter maintained at greater than 248 degrees Fahrenheit meeting the specifications for particle retention of 99.95 % for 0.3 um as prescribed in the test method. The sample then passed thorough a knockout Greenberg-Smith impinger containing 50 ml of 0.1 N H_2SO_4 followed by two standard size Greenberg-Smith impingers also containing 0.1N H_2SO_4. The sample then passed through two standard size modified Greenberg-Smith impingers containing 0.1N NaOH followed by a silica gel impinger before being measured by a dry gas meter. Hydrogenated halogen compounds, including hydrogen fluoride, were captured in the acidic impinger solutions while the remaining elemental halogens are captured in the basic impinger solutions. After completion of the test run, a leak check was performed and the sampling system was partially disassembled and transported to the mobile laboratory for recovery.

Sampling trains were weighed gravimetrically for moisture calculations, and recovered into appropriately labeled sample jars with deionized H_2O.

Enthalpy Analytical in Durham, North Carolina performed the analysis for the acidic impinger fractions for HF by ion chromatography. The filter and NaOH impingers fractions of the sample train were not analyzed but were archived.

Enthalpy calculated detection limits by the analysis of at least seven replicate standards at a concentration near the expected MDL. To determine the MDL value, the standard deviation of the replicate analysis was calculated and that number was multiplied by the Student t-factor that corresponds to the number of replicates analyzed. The MDL value meets the criteria stated in CFR Title 40, Part 136B. If the MDL determined did not meet these criteria, a default MDL value was used of 1/10 of the concentration of the standard used to produce the MDL value.

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4.4 TOTAL FLUORIDE - METHOD 13B

Total fluoride emissions were measured using EPA Method 13B on four sources during the ICR test campaign. PCS Phosphate field personnel conducted the Method 13B testing during the ICR test period on three of the four sources. URS field personnel conducted the 13B testing on the PAP scrubber source. Previous test data collected by PCS Phosphate personnel using Method 13B was used in lieu of new testing on the other eight sources as allowed in Enclosure 2 instructions. Samples were collected on paper filters and in impingers containing DI water. Sampling was performed isokinetically with the filter temperature maintained at 248° ± 25° F. To analyze the samples, the particulate fraction was combined with the impinger solution and brought to known volume. The combined particulate fraction and the back-half (gaseous fraction) were then analyzed for total fluoride content by specific ion electrode. The 13B fluoride analysis was performed by on-site by the PCS Environmental Lab per their standard operating procedure.

The historical Method 13B test data for total fluoride collected by PCS Phosphate personnel is contained in Appendix A-14.

4.5 METALS – EPA METHOD 29

Emissions of specific metals (antimony, arsenic, beryllium, cadmium, chromium, cobalt, lead, manganese, nickel, phosphorus, and selenium) were determined using the procedures prescribed in EPA 29. A sample of the stack gas was withdrawn isokinetically from the source through a glass nozzle, heated probe, and heater filter prior to entering the impinger train. The impinger train was maintained in an ice bath with an exit temperature of less than 68 °F. Gas volume was measured by a dry gas meter. The impinger train consisted of an oversized modified Greenburg-Smith impinger, one standard Greenburg-Smith impinger, and three standard sized, modified Greenburg-Smith impingers. The second and third impingers contained a solution of 5% HNO_3 and 10% H_2O_2 in water. The fourth impinger was empty, and the final impinger contained silica gel. At the completion of each test run, following the final leak check, the sampling train was partially disassembled and transported to the mobile laboratory for sample recovery. The probe and nozzle was first rinsed and brushed with acetone followed by 0.1 N HNO_3 into separate jars. In the laboratory, the train was weighed gravimetrically for moisture determinations and recovered as prescribed in the test method.

Once the samples were transported back to the URS Laboratory in Morrisville, North Carolina, the acetone rinses were dried down at ambient temperatures and desiccated along with the filters. Following gravimetric analysis of the samples, the acetone rinses were reconstituted with 0.1N HNO_3 and added to the front half nitric rinses. Samples were then shipped to the Test America Laboratory in Sacramento, California for analysis by ICP-MS and CVAAS.

The metals analysis laboratory reports are contained in Appendix B-2. Test America calculates an MDL using the method of 7 replicate samples spiked at greater than 3 times the estimated MDL.

Regent blanks showed no significant levels of contamination. The analytical results for metals were blank corrected where the reagent blank level was measured above the analytical limit of detection. All raw and calculated results are shown on the Metals Emission Summary sheets in Appendix A for each source tested.

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4.6 EPA SW-846 METHOD 0061 (CHROMIUM 6^+)

EPA SW-846 Method 0061 was used for the determination of hexavalent chromium. The flue gas was collected isokinetically through a glass nozzle and probe, followed by Teflon impingers. A teflon line was placed down the probe liner to continuously recirculate the impinger reagent (KOH) , thereby preventing the reduction of Cr^{+6} between the nozzle and impinger. A peristaltic pump was used to recirculate the absorbing solution at > 50 ml/min. A series of four telfon impingers were used to contain the absorbing solution, followed by a glass impinger containing silica gel for moisture removal. All sample train components were cleaned prior to use by soaking in a 10 % HNO_3 bath. Reagent grade water was used for sample train recovery. The pH impinger reagent in the sample train was checked during sampling run to verify that it remains above 8.5.

The sample train was removed to field lab for purging with nitrogen for 30 minutes immediate after the sample run completion. The recovered impinger solution was filtered on-site through a disposable 0.45 micron acetate filter to remove insoluble matter. The option of determining total chromium from the sample train was not used.

The filtered solution was shipped for analysis to Test America Laboratories (TAL) in Knoxville, Tennessee for Cr^{+6} analysis by ion chromatography. The analytical reports from TAL for Cr^{+6} are contained in Appendix B-3

4.7 MERCURY

EPA Method 30B

EPA Reference Method 30B "Determination of Total Vapor Phase Mercury Emissions From Coal-Fired Combustion Sources Using Carbon Traps" was used to determine vaporous mercury concentration. With Method 30B, flue gas is extracted from a stack or duct using paired, sorbent media traps at a constant flow rate. The use of in-stack sorbent traps minimizes potential loss of mercury during transport through a probe/sample line. For each test run, paired train sampling is used to determine measurement precision and verify acceptability of the measured emissions data.

A dual console Apex Instruments Model XC 260 sorbent tube sampling system was used to sample flue gas onto the sorbent traps. The sorbent trap material was procured from Ohio Lumex and packed by URS. For the field recovery test the front section of one tube in each pair was spiked by URS with a known concentration of elemental mercury prior to sampling. The level of the spike was determined by collection and analysis of preliminary sorbent tube. The minimum spike level was 25 ng. An unspiked speciated trap was used in combination with a spiked trap for each train run pair.

QA/QC procedures required by Method 30B were adhered to throughout the program. The sorbent traps were analyzed using an Ohio Lumex 915+ thermal analyzer with M324 attachment. A Field Recovery Test based on recovery of an elemental Hg spike was used to assess measurement bias and to verify data acceptability.

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In accordance with Method 30B section 8.2.3.1.1, an Hg^{o} analytical bias test was performed to confirm that the analytical system results were within ±10% of the target value. All samples were analyzed by the URS laboratory in Morrisville, NC.

In accordance with Method 30B section 8.2.3.1.2, an Hg^{+2} analytical bias test was performed prior to field deployment to confirm that the analytical system results were within ±10% of the target value.

As previously approved by the EPA, sources where the presence of mercury is anticipated to be low (example oil-fired sources), spiking should be done at a level were spike is reliable and reproducible. The minimum spike level for this program was 25 ng. In this situation, if the QA/QC criteria for paired trap agreement of spike concentration with respect to sample concentration are not met, the test runs will still be considered as valid.

A total of 3 paired Method 30B test runs of 1-hour duration each, were conducted simultaneously with a single corresponding Ontario Hydro (OH) Method. The moisture and flow rate from the corresponding OH sample train was used for mass rate determination.

ASTM Standard D6784-02

ASTM Standard D6784-02 (Ontario Hydro Method) was used to determine concentrations of particle-bound, oxidized, and elemental mercury in the flue gas. The method requires isokinetic sampling of the flue gas at predetermined sample points derived from EPA Method 1.

The sample passed through a glass buttonhook style nozzle and through a glass-lined sample probe. Particle-bound mercury in the flue gas was collected on the probe liner and on a heated quartz filter heated to 248 °F. The sample was then pulled through a series of eight chilled impingers. The first three impingers contained 0.1N potassium chloride (KCl) to absorb oxidized mercury in the flue gas. The fourth impinger contained a solution of 5% nitric acid (HNO_3) and 10% hydrogen peroxide (H_2O_2) that oxidizes elemental mercury in the flue gas. After being oxidized, the elemental fraction is collected in the three impingers containing an acidified potassium permanganate ($KMnO_4$) solution. The final impinger contains silica gel to collect any residual moisture. The impingers are partially submerged in an ice bath to cool the flue gas sample to <68 °F. After completing the test run, the train was partially disassembled and transported to a mobile laboratory to be recovered and preserved. A field blank was collected for method QA/QC. Samples were logged and transported to an off-site laboratory for analysis.

The Ontario Hydro sample analysis for mercury species was performed by Test America in Knoxville Tennessee. The samples were shipped in batches periodically during the test program. The OH analytical reports are in Appendix B-4.

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4.8 EPA METHOD 320 (FTIR)

URS conducted EPA Method 320 testing to determine the concentration of Methyl Isobutyl Ketone (MIBK) and HF using FTIR from the Purified Acid Plant (PAP) chiller and scrubber sources. A series of three 1-hour test runs were conducted at each source along with pre and post sampling analyte (or surrogate) spiking. Moisture and molecular weight were determined from the FTIR data. The stack gas velocity (delta P) was determined before and after each FTIR test run by a electronic manometer (Hastings Shortridge Model ADM-870). The Method 320 field test summary and tabular results along with the supporting quality assurance (QA) field data are presented in Appendix A-11-1 and A-12-5.

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Specific quality assurance and quality control (QA/QC) procedures were used during the test program to cover field sampling, recovery, sample analysis, data reduction, and interpretation of results. QA/QC procedures were followed to ensure the production of useful and valid data. This section will describe these procedures and will report the test program QA parameters, which indicate data quality.

5.1 SAMPLING QA/QC

Prior to and immediately following each test run, leak checks of all manual method sampling trains were performed to verify no sample dilution of the sampled stack gas was occurring during the test. All leak checks were recorded properly and met the leak criterion. Where any leak check failed, the test run was aborted and repeated. Prior to and following the tests, pitot leak checks were performed on the pressure differential measuring systems.

The oxygen and carbon dioxide analyzers used to measure the flue gas molecular weight from integrated bags were calibrated using EPA Protocol 1 gases. Copies of the gas cylinder certifications are included in the QA appendix.

Sampling media and glassware were prepared using the prescribed procedures for the applicable test method. Glassware was re-cleaned in the laboratory between the testing on different source types. Field blanks were taken periodically (for each source group) to verify cleanliness between source units.

5.2 OTHER QA/QC

The sampling and recovery procedures specified in EPA Methods 5, 26A, 29, OTM-028, SW846-0061, and ASTM D6784 were utilized. The following QA/QC procedures were satisfied for the purpose of ensuring valid results:

- All sampling equipment passed a thorough visual and operation check prior to and after transport to ensure clean and operable parts. Equipment that failed to pass this check was not used in the field.
- Manometers were leveled and zeroed before measuring the differential pressure across the S-type pitot tubes.
- Each leg of the S-type pitot tube achieved the prescribed leak criterion described in EPA Method 2.
- The temperature measurement system was capable of measuring the ambient temperature prior to each traverse to within ±2°C of the average measured ambient temperature.
- The field personnel reviewed sampling data forms daily on-site during testing. Checks of the isokinetic sampling rate were conducted in the field. Any test run that failed the isokinetic criteria were repeated.
- Ice was maintained in the impinger baths at all times; exit temperatures were maintained at less than 20°C (<68°F) except for the front half of the OTM028 impinger train which was maintained at less than 29°C (<85°F).
- Readings of the dry gas meter, stack gas velocity head (ΔP), sample line orifice meter pressure differential (ΔH), temperature, and vacuum pump were made during sampling at each traverse point at five minutes intervals.

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- Dry gas meters were calibrated before the test program and the calibration was rechecked after the test was completed using the ALT-009 Gamma QA procedure. When the gamma QA criterion was exceeded the dry gas meter was recalibrated and the lower meter calibration coefficient was used to calculate the final results.
- Field blanks were conducted and analyzed for each manual test method performed on-site. Reagent blanks were collected and archived in case of further need for analysis.

5.3 TEST METHOD EXCEPTIONS AND TEST PROGRAM NOTES

The following exceptions to test methods and test program notes effecting the execution and quality control of the emissions testing are noted in this section.

Due to the large sample volume (3.4 m^3) requested and the high stack gas moisture encountered, the Method 0061 sampling train was modified to incorporate extra knockout impingers prior to the final silica gel impinger. Even with the extra impingers the sampling runs were stopped periodically to empty the impinger contents into a dedicated sample container. The pH of the sampling solution was checked during the impinger change. Multiple changes of the knock out and silica gel impingers were required for a majority of the sources due to the high moisture.

After completion of the testing sequence at the DFP Kiln (EP-701) during the data review process, a leak was determined to have occurred in the integrated bag collection system on the meter box. Subsequent collection of integrated bags on an independent collection system at the source the following week indicated a significantly different (lower) O_2 content. All integrated bag samples collected during the test period were voided. A default value of 8.1 % CO_2 and 13.1 % O_2 was used in the calculation of molecular weight and oxygen correction calculations. The default value was determined from previous CEM test data on the source and verified for reasonableness by additional bag samples after completion of the DFP Kiln emission test sequence.

The emission test results for combustion type sources are with expressed in the test report corrected to 3 % oxygen. These sources include the Calciner, DFP Kiln and the Rock Dryer. All other sources in the test program are expressed at the as measured oxygen concentration without correction as the majority of the sources are not combustion type processes. EPA test method representatives approved this approach.

On the non-combustion sources tested during the program, if an individual Method 3A/3B integrated bag result was compromised the average value from the remaining valid runs was averaged and used as a default value to calculate the molecular weight.

After completion of the Phosphoric Acid plant emission testing, additional dry gas meter calibrations were conducted when the dry gas meter gamma QA acceptance criterion was exceeded. Final results were calculated with the dry gas meter calibration factor which yielded the lower gas volume per prescribed reference method guidance.

The 14-day hold time for Method 0061 analysis was exceeded for the PA-4 sources due to an instrument failure in the laboratory. The samples exceeding the hold time were reanalyzed on July 24th with similar results. The higher value from the first analysis (7/7/10) was used to calculate the presented results.

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Based on the low level of Hg in the preliminary samples at the Phosphoric Acid plants, the EPA Method 30B test runs were conducted at the lowest spiking level available (25 ng) and an increased sample flue gas. Because the levels of flue gas Hg were so low, the test data did not meet the method recommendation for spiking levels being 50-150% of the actual measured values. Discussion with the EPA confirmed the spiking criteria is guidance, but is not as a requirement of the test method.

The speciated 30B sorbent tubes for mercury at the Phosphoric Acid sources were at or below the analytical detection limit of 2.6 ng for individual bed components. Therefore the speciated Hg tube results from Method 30B are no considered valid nor presented in the results summary. The as measured amounts are presented in the analytical data. Method 30B Run 1 traps at the PA-4 Crossflow Scrubber was lost during the analysis due to an instrument calibration error.

After completion of the mercury testing on the Phosphoric Acid plants, it was determined that mercury sampling would be discontinued for the Aurora plant downstream sources because the measured mercury content was below the measured method sensitivity. EPA test method representatives approved the decision to discontinue further Hg testing during the ICR test program.

The extraction solvent for the OTM-28 train (Methylene Chloride) was changed to hexane during the course of the ICR test program. The change was approved by EPA test method representatives. No impact upon the data quality is expected.

The stack gas velocity head (delta P) was determined with an electronic manometer (Hastings Shortridge ADM-680) rather than an inclined manometer for all emissions testing on the SPA2, SPA3/4 and PAP sources due to low stack gas velocity. The ADM-680 calibration certificates are in Appendix D.

Water samples from the SPA 2, SPA3/4 and Rock Dryer test locations were not collected. A suitable sample collection location from the scrubbers was not available in the SPA Process area. The configuration of scrubber effluent piping in the SPA process area was such that the scrubber water was discharged into a combined effluent stream (ditch) that precluded collection of the water sample during the OTM-28 testing. Installation of a tap to isolate the water discharge stream would have required shutting down the process units. The collection of water samples at the Rock Dryer during OTM 28 test method was inadvertently overlooked.

The test ports on SPA3/4 were too small to accommodate the combined pitot tube and probe assembly. Therefore with EPA permission, two ports 90 degrees apart just above the sample port were used to determine the velocity profile prior to and after the sampling traverse. The isokinetic sampling runs were completed along a single traverse at a lower port which would accommodate the sample train. The dwell time at each point on the isokinetic traverse was doubled. The sample ports exceeded the equivalent diameter criterion of Method 1. Due to the low stack gas velocity for the source there is expected to be little impact on data quality.

The geometry and size of the exhaust duct at the PAP chiller precluded simultaneous measurements of gas velocity and MIBK concentration. The internal diameter of the exhaust duct was less than 4 inches. In addition, the withdrawn of sample via heated line to the FTIR altered the measured stack velocity because it was so low. Therefore the flue gas velocity was measured independently before or after the Method 320 test run.

The Method 320 testing used formaldehyde as spiking surrogate for hydrogen fluoride.

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Appendix A
Sampling Data

Appendix B
Analytical Data

Appendix C
Process Data

Appendix D
Field Data Sheets
And
QA/QC Supporting Data

Appendix E
Solid Material Assay (PCS)

Appendix F
EPA ERT Files & Spreadsheet

Appendix G
Test Plans & Correspondence

Appendix A-1-6
Emission Test Data for Total Fluoride

URS					Analytical Flag	mass / sample	Sample Volume	Emission Concentration	Volumetric Flow Rate	Emission Rate	O_2	Emission Concentration
Sample	Pollutant	Date	Start	End		mg	dscf	mg/dscf	dscfm	lb/hr	%	gr/dscf @ 3% O2
Calciner #3 R1	F^-	8/3/2010	9:19	10:35		0.338	44.976	0.0075	40,799	4.06E-02	14.8	3.40E-04
Calciner #3 R2	F^-	8/3/2010	10:50	12:06		0.296	41.867	0.0071	39,775	3.72E-02	14.8	3.20E-04
Calciner #3 R3	F^-	8/3/2010	15:35	17:16		0.276	45.546	0.0061	41,182	3.30E-02	14.8	2.74E-04
Average						0.303	44.129	0.0069	40,585	3.69E-02	14.8	3.12E-04

[a] Method 13B collected and anlayzed by PCS - Results presented here for purpose of Data Entry into ERT

URS

Date	8/3/2010	8/3/2010	8/3/2010	----------
Location/Condition	Calciner #3	Calciner #3	Calciner #3	Calciner #3
Run	1	2	3	Average
Worksheet Tab Name	**Calciner #3 R1**	**Calciner #3 R2**	**Calciner #3 R3**	----------
Start Time	9:19	10:50	15:35	----------
End Time	10:35	12:06	17:16	----------
Source Area (ft^2)	28.27	28.27	28.27	28.27
Nozzle Diameter (")	0.286	0.284	0.286	0.286
DGM #	PCS-2	PCS-2	PCS-2	----------
DGM Calibration Factor (Y_D)	1.005	1.005	1.005	----------
H@	1.869	1.869	1.869	----------
Pitot (Cp)	0.84	0.84	0.84	0.84
Stack Barometric Pressure ("Hg)	30.09	30.12	30.12	30.11
Static Pressure ("H_2O)	-0.28	-0.28	-0.28	-0.28
Test Duration (min)	72	72	72	72.00
Minutes per point	3	3	3	3.00
Meter Volume x DGMCF (ft^3)	45.230	42.426	46.258	44.64
Impinger Mass Gain (g)	729.6	695.5	843.9	756.32
Meter Temperature (R)	535.6	540.0	541.5	539.02
Average H (in H_2O)	1.44	1.30	1.48	1.41
Meter Pressure ("Hg)	30.20	30.22	30.23	30.21
% H_2O at saturation	32.1	32.1	32.8	32.34
% H_2O	32.1	32.1	32.8	32.34
% CO_2	8.6	8.6	8.6	8.60
% O_2	14.8	14.8	14.8	14.80
% N_2	76.6	76.6	76.6	76.60
Dry Molecular Weight (mw_{dry})	30.0	30.0	30.0	29.97
Source Molecular Weight (mw_g)	26.1	26.1	26.0	26.10
Avg. SQRT Delta P	0.65	0.63	0.66	0.65
Avg. Source Temperature (R)	620.1	620.2	621.1	620.48
Avg. Source Pressure ("Hg)	30.07	30.10	30.10	30.09
Gas Velocity (ft/s)	41.4	40.3	42.3	41.35
Stack Gas Flow Rate (acfm)	70,270	68,411	71,749	70,143
Stack Gas Flow Rate (dscfm)	40,799	39,775	41,182	40,585
Standard Sample Volume (dscf)	44.976	41.867	45.546	44.13
Average Isokinetic %	97.4	93.9	97.7	96.32
Average sqrt(H)	1.19	1.14	1.21	1.18
Y(qa)	1.030	1.052	1.029	1.04
Y (± 5%)	2.5%	4.7%	2.4%	3.2%

Program verification: N:\FIELD\QA\Calculation Sheets\\Iso Sample Calc 1003 QA.pdf

URS

Client	PCS Phosphate	Location	Calciner #3	Diameter (or width)	72	Area (ft^2)	28.27		
Run	1	Test Method	13B	Length (if rectangular)		Height rel. to barometer (ft)	100	DGM #	PCS-2
Date	8/3/2010	DGMCF (Yd)	1.005	Measured Pbar ("Hg)	30.19	Adjusted Pbar	30.09	ΔH@	1.869
duration (min)	72	Cp	0.84	Static P ("H_2O)	-0.28	Nozzle Dia.(")	0.286	min/point	3

Sample Pt.	Time	DGM Reading (ft^3)	Delta P ("H_2O)	SQRT Delta P ("H_2O)	Delta H ("H_2O)	Source Temp. (F)	DGM Temp. Inlet (F)	Outlet (F)	Velocity (ft/s)
Average	--	--	0.429	0.649	1.438	160.5	75.9		41.4
Total	1:12	45.005							
Start	9:19								
End	10:35								
NW1	9:19	600.500	0.14	0.37	0.46	160	72	72	23.9
2	9:22	601.5	0.31	0.56	1.21	164	72	72	35.6
3	9:25	603.2	0.36	0.60	1.17	165	72	72	38.4
4	9:28	604.8	0.36	0.60	1.17	164	73	73	38.4
5	9:31	606.5	0.39	0.62	1.27	164	73	73	40.0
6	9:34	608.4	0.43	0.66	1.4	165	74	74	42.0
7	9:37	610.3	0.56	0.75	1.83	161	74	74	47.8
8	9:40	612.4	0.58	0.76	1.89	161	75	75	48.6
9	9:43	614.6	0.57	0.75	1.86	160	75	75	48.2
10	9:46	616.7	0.58	0.76	1.89	160	76	76	48.6
11	9:49	619.1	0.60	0.77	1.96	163	76	76	49.5
12	9:52	621.5	0.54	0.73	1.77	164	77	77	47.0
	9:55	623.572							
SW1	9:59	623.572	0.27	0.52	1.56	167	77	77	33.3
2	10:02	625.0	0.36	0.60	1.17	160	77	77	38.3
3	10:05	626.6	0.39	0.62	1.27	160	77	77	39.8
4	10:08	628.0	0.38	0.62	1.25	162	77	77	39.4
5	10:11	630.2	0.40	0.63	1.31	161	78	78	40.4
6	10:14	632.0	0.42	0.65	1.37	157	78	78	41.2
7	10:17	633.9	0.46	0.68	1.5	159	78	78	43.2
8	10:20	635.8	0.46	0.68	1.5	150	78	78	42.9
9	10:23	637.8	0.40	0.63	1.31	152	78	78	40.1
10	10:26	639.7	0.43	0.66	1.41	153	78	78	41.6
11	10:29	641.8	0.45	0.67	1.47	163	78	78	42.9
12	10:32	643.8	0.46	0.68	1.5	156	78	78	43.1
	10:35	645.505							

Impinger Train Mass Measurments

Impinger	Initial (g)	Final (g)	Gain (g)
1	691.5	950.2	258.7
2	664.2	877.3	213.0
3	654.5	827.2	172.6
4	786.8	872.1	85.3
5			0.0
6			0.0
7			0.0
8			0.0
Sum			729.6

Molecular Weight Measurements

	CO_2 (%)	O_2 (%)	N_2 (%)
1	8.6	14.8	76.6
4			
3			
4			
Avg	8.6	14.8	76.6

%H_2O (sat)	32.1
Bws (H_2O)	0.321
MW dry	29.97
MW wet	26.13
Vw std	34.38
Mol Fraxn dry	0.6789
Vm	45.005
Tmeter (R)	535.6
Pmeter	30.20
Vm std	44.976
% Isokinetic	97.4

URS

Client	PCS Phosphate	Location	Calciner #3	Diameter (or width)	72	Area (ft^2)	28.27		
Run	2	Test Method	13B	Length (if rectangular)		Height rel. to barometer (ft)	100	DGM #	PCS-2
Date	8/3/2010	DGMCF (Yd)	1.005	Measured Pbar ("Hg)	30.22	Adjusted Pbar	30.12	ΔH@	1.869
duration (min)	72	Cp	0.84	Static P ("H_2O)	-0.28	Nozzle Dia.(")	0.2841	min/point	3

Sample Pt.	Time	DGM Reading (ft^3)	Delta P ("H_2O)	SQRT Delta P ("H_2O)	Delta H ("H_2O)	Source Temp. (F)	DGM Temp. Inlet (F)	Outlet (F)	Velocity (ft/s)
Average	--	--	0.404	0.632	1.301	160.5	80.3		40.3
Total	1:12	42.215							
Start	10:50								
End	12:06								
NW1	10:50	646.000	0.23	0.48	0.75	156	78	78	30.5
2	10:53	647.1	0.32	0.57	1.03	156	78	78	35.9
3	10:56	648.9	0.34	0.58	1.1	164	78	78	37.3
4	10:59	650.6	0.34	0.58	1.1	164	79	79	37.3
5	11:02	652.1	0.38	0.62	1.23	163	79	79	39.4
6	11:05	653.8	0.42	0.65	1.36	163	79	79	41.4
7	11:08	656.5	0.42	0.65	1.36	160	80	80	41.3
8	11:11	657.2	0.49	0.70	1.58	158	80	80	44.5
9	11:14	659.2	0.53	0.73	1.67	163	81	81	46.5
10	11:17	661.2	0.53	0.73	1.71	164	81	81	46.6
11	11:20	663.3	0.56	0.75	1.81	154	81	81	47.5
12	11:23	665.4	0.52	0.72	1.67	161	82	82	46.0
	11:26	667.542							
SW1	11:30	667.542	0.28	0.53	0.90	162	81	81	33.8
2	11:33	669.1	0.36	0.60	1.16	155	81	81	38.1
3	11:36	670.5	0.36	0.60	1.16	159	81	81	38.2
4	11:39	672.0	0.37	0.61	1.19	162	81	81	38.8
5	11:42	673.9	0.41	0.64	1.32	158	81	81	40.8
6	11:45	675.6	0.41	0.64	1.32	162	81	81	40.9
7	11:48	677.5	0.38	0.62	1.23	162	81	81	39.4
8	11:51	679.3	0.40	0.63	1.29	162	81	81	40.4
9	11:54	681.1	0.41	0.64	1.32	156	81	81	40.7
10	11:57	683.2	0.37	0.61	1.19	162	81	81	38.8
11	12:00	684.8	0.44	0.66	1.42	163	81	81	42.4
12	12:03	686.4	0.42	0.65	1.36	163	81	81	41.4
	12:06	688.215							

Impinger Train Mass Measurments

Impinger	Initial (g)	Final (g)	Gain (g)
1	676.1	932.3	256.2
2	679.8	867.9	188.1
3	680.5	848.5	168.0
4	782.7	866.0	83.3
5			0.0
6			0.0
7			0.0
8			0.0
Sum			695.5

Molecular Weight Measurements

	CO_2 (%)	O_2 (%)	N_2 (%)
1	8.6	14.8	76.6
2			
3			
4			
Avg	8.6	14.8	76.6

%H_2O (sat)	32.1
Bws (H_2O)	0.321
MW dry	29.97
MW wet	26.13
Vw std	32.77
Mol Fraxn dry	0.6793
Vm	42.215
Tmeter (R)	540.0
Pmeter	30.22
Vm std	41.867
% Isokinetic	93.9

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URS

Client	PCS Phosphate	Location	Calciner #3	Diameter (or width)	72	Area (ft^2)	28.27		
Run	3	Test Method	13B	Length (if rectangular)		Height rel. to barometer (ft)	100	DGM #	PCS-2
Date	8/3/2010	DGMCF (Yd)	1.005	Measured Pbar ("Hg)	30.22	Adjusted Pbar	30.12	⌐H@	1.869
duration (min)	72	Cp	0.84	Static P ("H_2O)	-0.28	Nozzle Dia.(")	0.2855	min/point	3

Sample Pt.	Time	DGM Reading (ft^3)	Delta P ("H_2O)	SQRT Delta P ("H_2O)	Delta H ("H_2O)	Source Temp. (F)	DGM Temp. Inlet (F)	Outlet (F)	Velocity (ft/s)
Average	--	--	0.444	0.662	1.483	161.4	81.8		42.3
Total	1:12	46.028							
Start	15:35								
End	17:16								
NW1	12:18	688.700	0.18	0.42	0.60	163	80	80	27.2
2	12:21	689.0	0.28	0.53	0.94	163	80	80	33.9
3	12:24	691.4	0.37	0.61	1.235	163	80	80	38.9
4	12:27	693.3	0.47	0.69	1.569	163	81	81	43.9
5	12:30	695.4	0.52	0.72	1.737	161	81	81	46.1
6	12:33	697.2	0.60	0.77	2.000	161	81	81	49.5
7	12:36	699.3	0.56	0.75	1.870	161	81	81	47.8
8	12:39	701.6	0.56	0.75	1.870	161	82	82	47.8
9	12:42	703.8	0.59	0.77	1.970	161	82	82	49.1
10	12:45	706.1	0.54	0.73	1.80	162	82	82	47.0
11	12:48	708.2	0.52	0.72	1.737	160	82	82	46.0
12	12:51	710.5	0.56	0.75	1.870	161	82	82	47.8
	12:54	712.628							
SW1	12:55	712.628	0.31	0.56	1.035	155	82	82	35.4
2	12:58	714.3	0.35	0.59	1.170	160	82	82	37.8
3	13:01	716.0	0.40	0.63	1.336	160	82	82	40.4
4	13:04	717.7	0.39	0.62	1.303	161	82	82	39.9
5	13:07	719.5	0.42	0.65	1.402	163	82	82	41.5
6	13:10	721.3	0.45	0.67	1.503	162	82	82	42.9
7	13:13	723.3	0.45	0.67	1.503	162	82	82	42.9
8	13:16	725.2	0.40	0.63	1.336	163	83	83	40.5
9	13:19	727.1	0.43	0.66	1.436	163	83	83	42.0
10	13:22	729.0	0.44	0.66	1.470	163	83	83	42.5
11	13:25	730.9	0.44	0.66	1.470	163	83	83	42.5
12	13:28	732.8	0.43	0.66	1.436	159	83	83	41.8
	13:31	734.728							

Impinger Train Mass Measurments			
Impinger	Initial (g)	Final (g)	Gain (g)
1	662.6	979.8	317.2
2	641.3	889.7	248.5
3	691.3	785.9	94.5
4	680.4	864.1	183.6
5			0.0
6			0.0
7			0.0
8			0.0
Sum			843.9

Molecular Weight Measurements			
	CO_2 (%)	O_2 (%)	N_2 (%)
1	8.6	14.8	76.6
2			
3			
4			
Avg	8.6	14.8	76.6

%H_2O (sat)	32.8
Bws (H_2O)	0.328
MW dry	29.97
MW wet	26.04
Vw std	39.76
Mol Fraxn dry	0.6716
Vm	46.028
Tmeter (R)	541.5
Pmeter	30.23
Vm std	45.546
% Isokinetic	97.7

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 0 4 2015

OFFICE OF
AIR AND RADIATION

Ms. Casey Fernung Bradford, Counsel for PCS
Jones Day
1420 Peachtree Street, NE
Suite 800
Atlanta, Georgia 30309-3053

Dear Ms. Bradford:

This is in reply to your October 16, 2015 petition for reconsideration of the final rule, "Phosphoric Acid Manufacturing and Phosphate Fertilizer Production RTR and Standards of Performance for Phosphate Processing" (80 FR 50386, August 19, 2015), which you submitted pursuant to section 307(d)(7)(B) of the Clean Air Act (CAA), on behalf of your client, Potash Corporation of Saskatchewan (PCS). The U.S. Environmental Protection Agency has received multiple petitions for reconsideration of this final rule. Your petition seeks reconsideration of two issues: (1) the total fluoride emission limit for calciners in the final rule, and (2) the requirement in the final rule for liquid-to-gas ratio monitoring of low energy scrubbers.

In response to your petition asking the EPA to reconsider several aspects of this rule, and pursuant to CAA section 307(d)(7)(B), I grant reconsideration of the final rule on both of the above issues.

The EPA intends to issue a *Federal Register* notice proposing the results of our reconsideration process on the issues identified above expeditiously, although the schedule of this proposal may depend on the time required for industry to respond to our request for additional information to support the reconsideration request.

The petition letter also requests a stay of the final rule for 90 days under the Administrative Procedures Act or the CAA. We intend to take final action on the request for a stay of the rule no later than the date we take final action on the issues described above.

If you have any questions regarding the reconsideration process, please contact Peter Tsirigotis, Director of the Sector Policies and Programs Division, at (919) 541-9411. We thank you for your continuing interest in this rule and look forward to hearing from you during the reconsideration process.

Sincerely,

Janet G. McCabe
Acting Assistant Administrator

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PCS AMENDED PETITION - ATTACHMENT C

RE: PCS - Calciner MACT Test Report

Casey F Bradford/JonesDay to: Fairchild, Susan 05/10/2016 05:37 PM
4-8119
Cc: "Barnett, Keith", "brandon.long@erg.com", "Garwood, Gerri", "jason.renzaglia@erg.com", "Jessica.DeMonte", RSmith

Susan,

Thank you for your email. Attached is a letter that I was preparing about the emission limits for both mercury and total fluorides at the PCS Aurora calciners when I received your email. PCS does wish to meet with EPA. Available dates for PCS to come to Raleigh are: 5/24 or 5/26. Please let me know what dates work and who will be attending for EPA. I can let you know who will attend for PCS in the coming days.

As explained in the letter, PCS thinks that the mercury limit for the calciners needs to be revised. PCS was surprised by the compliance test results for mercury which exceeded the MACT floor standard at three of the calciners. Since that time, PCS has collected a large amount of new data on mercury emissions and related process variables to try to understand the test results, but no straightforward explanation has been identified. We would like to present the additional mercury information to EPA at the meeting and seek a path forward to updating the MACT floor to reflect the current emissions data for the calciners. PCS does not make this request lightly. At this point in its testing and analysis of mercury emissions, PCS does not see any other reasonable alternative. We will also be prepared to update you on our assessment of the fluoride limit based on the compliance test results.

Thanks again,
Casey

- 5.10.2016 PCS Letter.PDF

Casey Fernung Bradford (bio)
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Atlanta, GA 30309
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"Fairchild, Susan" Casey, We've reviewed the data and think it may... 05/09/2016 12:55:01 PM

From: "Fairchild, Susan" <Fairchild.Susan@epa.gov>
To: Casey F Bradford <cbradford@jonesday.com>
Cc: "Barnett, Keith" <Barnett.Keith@epa.gov>, "Garwood, Gerri" <Garwood.Gerri@epa.gov>, "jason.renzaglia@erg.com" <jason.renzaglia@erg.com>, "brandon.long@erg.com" <brandon.long@erg.com>
Date: 05/09/2016 12:55 PM

Subject: RE: PCS - Calciner MACT Test Report

Casey,
We've reviewed the data and think it may be a good point to discuss with PCS where we are on this.

If you would like to meet with EPA, please let me know your available dates and times and I'll set something up with the involved parties here.

Thanks,

Susan Fairchild
Senior Environmental Scientist
(919) 541-5167

USPS Address:
OAQPS/SPPD/MMG
Mail Code D 243-04
Research Triangle Park, NC 27711

From: Casey F Bradford [mailto:cbradford@jonesday.com]
Sent: Thursday, March 31, 2016 11:25 AM
To: Fairchild, Susan <Fairchild.Susan@epa.gov>
Cc: Barnett, Keith <Barnett.Keith@epa.gov>; TBaker@potashcorp.com; Jessica.DeMonte@potashcorp.com
Subject: PCS - Calciner MACT Test Report

Susan,

Please see the attached MACT test report that PCS submitted to North Carolina DEQ for the calciners. PCS is also submitting these results electronically via ERT reports as required by the recent changes in Subpart AA. ERT reports are being submitted for each calciner according to the applicable 60-day reporting period.

As I mentioned in a previous email, Hg emissions from three calciners were above the new MACT floor limit at the time of testing. Mercury emissions from the other three calciners were close to but did not exceed the limit. To understand these results, PCS has been studying process data at the time of testing and collecting a large amount of additional process data for the calciners. The study so far has revealed a lot more variability in feed mercury content than was anticipated. PCS is concerned that the 2010 and 2014 ICR data (which are the basis for the MACT floor limit) do not reflect the variability that actually occurs in feed mercury content. Because mercury in the feed cannot be predicted or controlled, PCS is studying other process and control device parameters to figure out whether there is a feasible way to make the limit achievable during representative operating conditions, which include significant variability in feed mercury content. We are still collecting data and waiting for lab results at this point. We anticipate having new information to share by the end of April or early May.

You will also see that the recent fluoride results were below the new fluoride limit for all calciners. While this is certainly good news, PCS is still concerned that the fluoride limit is not achievable during other representative operating conditions; including, for example, the conditions experienced during the 2014

fluoride testing which produced results in excess of the limit that was established in 2015. PCS has explained that the 2014 fluoride results (expressed in pounds *per ton of feed*) were obtained during a period of low feed inventory, which led to high feed moisture content and therefore low feed rates and high residence time. Although PCS continues to believe that feed rate can influence fluoride emissions, PCS has been collecting more data on fluoride in the calciner feed and looking for other information that could shed light on fluoride emissions variability. As with mercury, we expect to have more information to share with EPA in April or early May.

Thanks,
Casey

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JONES DAY

1420 PEACHTREE STREET, N.E. • SUITE 800 • ATLANTA, GEORGIA 30309.3053
TELEPHONE: +1.404.581.3939 • FACSIMILE: +1.404.581.8330

May 10, 2016

Sent Via Email & Certified Mail

Ms. Susan Fairchild
Environmental Protection Agency
109 T.W. Alexander Drive
Mail Code: D243-04
Research Triangle Park, NC 27711
Susan.Fairchild@epa.gov

Re: PCS Phosphate Company, Inc. / MACT Limit for Mercury Emissions from Existing Phosphate Rock Calciners

Dear Ms. Fairchild:

Thank you for your May 9, 2016 email. As suggested in your email, PCS Phosphate Company, Inc. (PCS) does wish to have an in-person meeting with EPA to discuss the need for a revision of the MACT floor limit that EPA set on mercury emissions from existing phosphate rock calciners in the August 2015 final rule to revise 40 C.F.R. Part 63 Subpart AA. 80 Fed. Reg. 50,386 (Aug. 19, 2015). After collecting and reviewing a considerable amount of new data on mercury emissions and other process variables, which PCS would like to present to EPA at a meeting, PCS has concluded that the calciner mercury limit in the final rule does not reflect the MACT floor for mercury emissions during the expected range of representative operating conditions at the PCS calciners in Aurora, North Carolina. As such, PCS requests an opportunity to collect additional Method 30B test data on mercury emissions which can then be used to re-calculate the mercury MACT floor.

Under section 112(d)(3)(B) of the Clean Air Act, a MACT floor limit must reflect the average emissions achieved by the best performing five sources in a source category with fewer than 30 sources. The six calciners at PCS' facility in Aurora are the only existing phosphate rock calciners in the Subpart AA source category. Therefore, the mercury MACT floor is supposed to reflect the average emissions already achieved by the PCS calciners. EPA determined the MACT floor in its August 2015 final rule based on mercury test data collected for the PCS calciners in 2010 and 2014. EPA applied its Upper Prediction Limit (UPL) methodology to the results of 2010 and 2014 mercury testing and determined the MACT floor to be 0.14 mg/dscm at three percent oxygen.

As required by the final rule, PCS conducted initial performance testing of mercury emissions from the calciners earlier this year. The test report sent to you on March 31, 2016 shows that initial performance test results for Calciners 1, 3 and 4 exceeded the new MACT floor limit for mercury emissions from existing calciners. Mercury emissions from the other three calciners (Nos. 2, 5 and 6) were close to, but did not exceed, the new mercury limit. For all six calciners,

the initial performance test results were significantly higher than the results of the 2010 and 2014 mercury testing that EPA used to set the MACT floor.

Since receiving the performance test results, PCS has collected and reviewed a large amount of additional process and emissions data for the calciners in an effort to understand mercury emissions variability. These data indicate that mercury emissions are more variable than reflected in the 2010 and 2014 test data or the UPL analysis that EPA used to set the MACT floor. PCS requests an opportunity to review the emissions and process data with EPA and discuss the path forward.

In addition to reviewing mercury-related data, PCS would like to update you on its assessment of the total fluoride emission limit for existing phosphate rock calciners. Our team would be available for a meeting in Raleigh, NC on May 24 or 26. Please let me know if any of these dates would work for EPA. You can reach me by telephone or email to schedule a meeting with PCS and discuss any questions you may have in the meantime. PCS appreciates EPA's attention to these matters which have a significant impact on the Aurora facility.

Respectfully submitted,



Casey Bradford
(404) 581-8119
cbradford@jonesday.com

Outside Counsel for PCS

cc: Mr. Keith Barnett
Environmental Protection Agency
109 T.W. Alexander Drive
Mail Code: D243-04
Research Triangle Park, NC 27709
Barnett.keith@Epa.gov

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Office of General Counsel
Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Mail Code: 2344A
Washington, DC 20460
Averback.jonathan@Epa.gov

NAI-1500990111v3

PCS AMENDED PETITION - ATTACHMENT D

PCS - Calciner MACT Test Report
Casey F Bradford/JonesDay to: Fairchild, Susan 03/31/2016 11:25 AM
4-8119
Cc: "Barnett, Keith", TBaker, Jessica.DeMonte

Susan,

Please see the attached MACT test report that PCS submitted to North Carolina DEQ for the calciners. PCS is also submitting these results electronically via ERT reports as required by the recent changes in Subpart AA. ERT reports are being submitted for each calciner according to the applicable 60-day reporting period.

As I mentioned in a previous email, Hg emissions from three calciners were above the new MACT floor limit at the time of testing. Mercury emissions from the other three calciners were close to but did not exceed the limit. To understand these results, PCS has been studying process data at the time of testing and collecting a large amount of additional process data for the calciners. The study so far has revealed a lot more variability in feed mercury content than was anticipated. PCS is concerned that the 2010 and 2014 ICR data (which are the basis for the MACT floor limit) do not reflect the variability that actually occurs in feed mercury content. Because mercury in the feed cannot be predicted or controlled, PCS is studying other process and control device parameters to figure out whether there is a feasible way to make the limit achievable during representative operating conditions, which include significant variability in feed mercury content. We are still collecting data and waiting for lab results at this point. We anticipate having new information to share by the end of April or early May.

You will also see that the recent fluoride results were below the new fluoride limit for all calciners. While this is certainly good news, PCS is still concerned that the fluoride limit is not achievable during other representative operating conditions; including, for example, the conditions experienced during the 2014 fluoride testing which produced results in excess of the limit that was established in 2015. PCS has explained that the 2014 fluoride results (expressed in pounds per ton of feed) were obtained during a period of low feed inventory, which led to high feed moisture content and therefore low feed rates and high residence time. Although PCS continues to believe that feed rate can influence fluoride emissions, PCS has been collecting more data on fluoride in the calciner feed and looking for other information that could shed light on fluoride emissions variability. As with mercury, we expect to have more information to share with EPA in April or early May.

Thanks,
Casey

- Final Calciner Report.pdf

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CERTIFIED MAIL

March 24, 2016

Mr. Robert Fisher, Regional Supervisor
NCDEQ - Division of Air Quality
943 Washington Square Mall
Washington, North Carolina 27889

Subject: **PCS Phosphate Company, Inc.**
Permit No. 4176T53
Facility ID: 0700071
Calciner No. 1 through No. 6 (ep 201 through 206)
Compliance Tests – Particulate, Total Fluoride and Mercury

Dear Robert:

Enclosed are the results of performance testing of total particulate, total fluoride and mercury emissions from the phosphate rock calciners in Aurora, North Carolina. PCS Phosphate Company, Inc. (PCS) is submitting the particulate test results in accordance with Specific Limitations and Conditions 2.1.2.A.1.c and 2.c of Air Quality Permit No. 4176T53 and 40 C.F.R. Part 63 Subpart AA, which require annual testing of particulate emissions. The test results demonstrate compliance with the permitted limit for particulate emissions.

On August 19, 2015, U.S. EPA issued a final rule with new MACT limits for total fluoride and mercury emissions from phosphate rock calciners under Subpart AA. 80 Fed. Reg. 50,386. The final rule allowed 180 days to conduct initial performance testing of total fluoride and mercury emissions. PCS conducted initial performance testing by the 180-day deadline for all calciners except No. 6, which had to be shut down unexpectedly due to equipment failure. By letter to North Carolina DEQ on February 10, 2016, PCS requested a 14-day force majeure extension of the testing deadline for mercury emissions at Calciner No. 6 under 40 C.F.R. § 63.7(a)(4) to allow time for repairing and resuming operation of the calciner. Initial performance testing of mercury emissions was completed at Calciner No. 6 by the extended deadline.

The enclosed results demonstrate compliance with the total fluoride emissions limit at all six calciners. In response to a PCS petition, U.S. EPA is reconsidering the new fluoride limit but has not stayed the effectiveness of that limit pending reconsideration. Although the enclosed test results comply with the new fluoride limit, PCS is still working with U.S. EPA to reconsider

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PotashCorp. | www.potashcorp.com

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00213

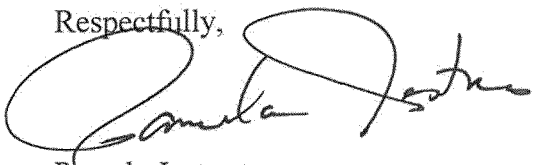
whether that limit is achievable over the full range of representative operating conditions.

For mercury, the enclosed results demonstrate compliance with the new limit at three calciners. Mercury emissions from the other three calciners (No.1, No. 3 and No. 4) exceeded the new MACT limit at the time of testing. As DEQ is aware, we have been studying the mercury test results and numerous process variables to evaluate potential reasons for the results and to determine whether the new mercury limit is achievable during representative operating conditions. Our assessment so far indicates significant variability in the mercury content of calciner feed over time, which was not reflected in the emissions data that U.S. EPA used to set the mercury limit. PCS is continuing to evaluate the mercury results and working toward a plan for retesting mercury emissions. We have advised U.S. EPA's rulemaking team of the initial mercury test results and our ongoing review of potential causes. We will update North Carolina DEQ and U.S EPA once we have completed our review.

As required by the recent changes to 40 C.F.R. § 63.607(e), PCS will also be submitting the enclosed results of MACT performance testing of mercury, total fluoride, and total particulate emissions to U.S. EPA's Compliance and Emissions Data Reporting Interface (CEDRI) using the Electronic Reporting Tool (ERT).

If there are any questions concerning this subject, please contact me at 252-322-8270

Respectfully,



Pamela Jestness
Sr. Environmental Engineer
PotashCorp-Aurora (PCS Phosphate Company, Inc.)

Enclosures

cc: Susan Fairchild, U.S. EPA (Fairchild.Susan@epa.gov)
Keith Barnett, U.S. EPA (Barnett.Keith@epa.gov)

NAI-1500927533v1

Subject: Calciner No. 1 through No. 6 Plant (ep 201 through 206)
Compliance Tests – Particulate, Total Fluoride and Mercury

Certification by Responsible Official [15A NCAC 2Q .0520]

As the responsible official for PCS Phosphate - Aurora Division, I, Mark Johnson, General Manager, certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

_____

Signature of Responsible Official Date of Certification

NAI-1500927533v1

40 CFR 63 SUBPART AA
PERFORMANCE TEST REPORT FOR

CALCINER NOS. 1 THROUGH 6
PCS PHOSPHATE COMPANY, INC.
AURORA, NC



Prepared for:

PCS Phosphate AURORA DIVISION

1530 NC Highway 306 South
Aurora, North Carolina 27806

Prepared by:

AECOM
1600 Perimeter Park Drive, Suite 400
Morrisville, North Carolina 27560
(919) 461-1100

March 2016

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17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00217

1.0 INTRODUCTION

AECOM was contracted by PCS Phosphate Company, Inc. (PCS), located near Aurora, North Carolina to perform emissions testing on the Calciner Nos. 1 - 6 (EP-201-206) to demonstrate compliance with 40 CFR Part 63, Subpart AA - National Emission Standards for Hazardous Air Pollutants (NESHAP), from Phosphoric Acid Manufacturing Plants. Testing was performed for mercury (Hg) and total fluorides (F^-) on all six calciners at the PCS Phosphate Company, Inc. (PCS) facility on January 26 – February 19, 2016. Testing was performed on Calciner Nos. 2, 4, 5 and 6 for filterable particulate matter (PM) between January 26 - February 9, 2016. Calciner Nos. 1 and 3 were tested during previous deployments (2015).

EPA Methods 5, 13B and 30B were performed on Calciner Nos. 1 – 6 to satisfy requirements stated in 40 CFR 63 Subpart AA - National Emission Standards for Hazardous Air Pollutants (NESHAP) from Phosphoric Acid Manufacturing Plants.

An AECOM test team consisting of David Marzec, Willie Lea, Francisco Cobo, Lance Burleson, Lee Marchman and Sam Warnock performed the emission testing. Brad Lee of PCS provided oversight for the sampling program.

Questions regarding this test report should be directed to Pam Jestness of PCS at (252) 322-8270.

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2.0 SUMMARY OF RESULTS

The objective of this test program was to demonstrate compliance with 40 CFR 63 Subpart AA. An EPA Method 5 sampling train was used to sample PM. Airflow was manually measured using EPA Methods 1 and 2 in conjunction with the EPA Method 5 sampling train. EPA Method 5 was used to determine stack gas moisture. The data quality objectives of the test program were met with regard to data availability and quality assurance for sample collection, flue gas monitoring and analysis activities. The test method quality requirements are discussed in Section 5 of this report.

Tables 2-1 through 2-3 summarize the results of the emission testing and compares the results to the emission limits stated in 40 CFR 63 Subpart AA. Results are based on the average of three 72 minute test runs for PM and Fl^- and three 60 minute test runs for Hg on Calciner Nos. 1 - 6. The process operating parameters recorded during the test program by PCS personnel are presented in Appendix B.

Table 2-1. Summary of PM Test Results
PCS Calciner Nos. 1-6

Source / ID	Average Test Result [a] (g/dscm)	Result	Emission Limit (g/dscm)
EP-201[b] Calciner No. 1	0.0108	Pass	0.181
EP-202 Calciner No. 2	0.0075	Pass	
EP – 203[b] Calciner No. 3	0.0124	Pass	
EP – 204 Calciner No. 4	0.0065	Pass	
EP – 205 Calciner No. 5	0.0109	Pass	
EP – 206 Calciner No. 6	0.0112	Pass	

[a] Results include water wash during second run of the test program. Calculations including all Runs and the water wash can be found in Appendix A.

[b] Calciner Nos. 1 and 3 results are from test programs performed in 2015. Calciner 1 emissions testing was performed by AECOM, Calciner 3 emissions testing was performed by PCS.

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Table 2-2. Summary of Fl^- Test Results
PCS Calciner Nos. 1-6

Source / ID	Average Test Result (lb/Ton Feed-Wet[a])	Result	Emission Limit (lb/Ton Feed-Wet)
EP-201 Calciner No. 1	0.0004	Pass	0.0009
EP-202 Calciner No. 2	0.0005	Pass	
EP – 203 Calciner No. 3	0.0004	Pass	
EP – 204 Calciner No. 4	0.0004	Pass	
EP – 205 Calciner No. 5	0.0003	Pass	
EP – 206 Calciner No. 6	0.0004	Pass	

[a] Wet ton Feed is based on entering any phosphate rock dryer or phosphate rock calciner including moisture and extraneous material as well as ore materials.

Table 2-3. Summary of Mercury Test Results
PCS Calciner Nos. 1-6

Source / ID	Average Test Result (mg/dscm@3%O_2)	Result	Hg Emission Limit (mg/dscm@3%O_2)
EP-201 Calciner No. 1	0.149	Fail	0.14
EP-202 Calciner No. 2	0.144	Pass[a]	
EP-202 Calciner No. 2	0.139	Pass	
EP – 203 Calciner No. 3	0.157	Fail	
EP – 204 Calciner No. 4	0.146	Fail	
EP – 205 Calciner No. 5	0.125	Pass	
EP – 206 Calciner No. 6	0.140	Pass	

[a] Calciner 2 Hg Test series were conducted twice on 1/30/16 and again on 2/13/16.

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3.0 SOURCE DESCRIPTION

PCS Phosphate operates six fluidized-bed calciners in Aurora, NC. Phosphate rock is used to manufacture phosphoric acid, defluorinated feed phosphate (DFP), and fertilizer. Phosphate rock may be calcined, dried or consumed directly as wet phosphate rock. Calcined or wet phosphate rock is consumed in phosphoric acid manufacturing. Dried rock is consumed in DFP manufacturing. Calcination takes place in the mill area. Beneficiated phosphate rock is received from wet rock storage via conveyors and is calcined in fluidized-bed calciners using hot air at a velocity high enough to keep the charge in a fluidized state.

In the calcining process, the wet phosphate rock is fed to the top of the preheat compartment which dries the rock using heat supplied by flue gases from the calcining bed below. Dry rock from the preheat compartment drops through internal or external down-comers into the calcining compartment. The temperature of the calcining bed is maintained below 1600°F by direct injection of bituminous coal/coke fuel mixture into the bed of suspended particles. The calciners can also fire No. 6 fuel oil as backup fuel. Hot calcined rock from the calcining bed drops through an internal down-comer to a cooling compartment. The cooled calcined rock product is discharged through a level control valve and transferred via covered conveyors to storage silos or to the phosphoric acid production area.

A venturi scrubber provides some particulate control before the exhaust enters the Wet Electrostatic Precipitators (WESPs). All calciners are equipped with WESPs for additional particulate control.

3.1 Sampling Locations

Calciners No. 1 through 6 are identical in design and measurement. The calciner stacks are 6 feet in diameter at the opening and are approximately 100 feet above grade elevation. The sample ports are approximately 25 feet downstream and 11 feet upstream from the nearest flow disturbance. Figure 3-1 is an example diagram of a calciner stacks located at PCS Aurora, NC.

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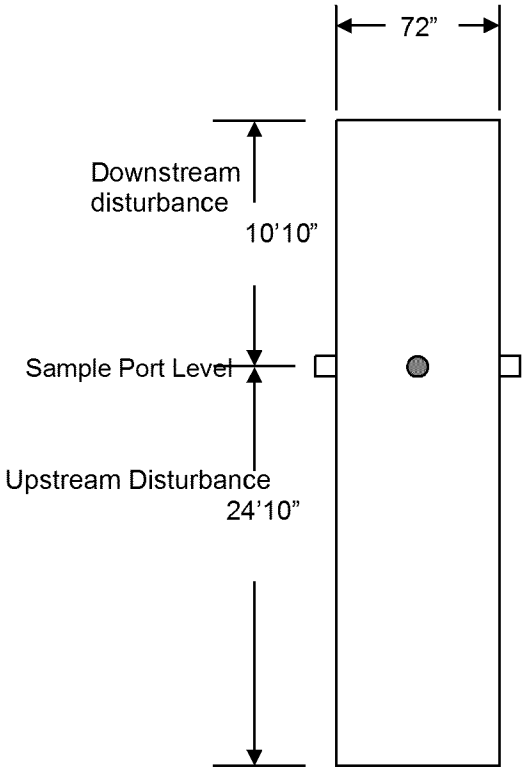


Figure 3-1. Example of Calciner Stack Diagram

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4.0 SAMPLING AND ANALYTICAL PROCEDURES

Table 4-1 summarizes the test methods (40 CFR 60, Appendix A) used during testing.

Table 4-1. Measurement Parameters and Reference Methods

Parameter	Reference Method[a]
Air Flow	EPA Methods 1 and 2
Molecular Weight (O_2 and CO_2)	EPA Method 3A[b]
Moisture	EPA Method 5
Filterable Particulate Matter	
Total Fluorides	EPA Method 13B
Vapor Phase Mercury	EPA Method 30B

[a] 40 CFR 60 Appendix A

[b] For Calciners 1-5 oxygen and carbon dioxide were collected using integrated bag samples and analyzed by Method 3A (CEM). For Calciner 6, three 1-hour test runs were performed to obtain oxygen and carbon dioxide. These values were used to calculate molecular weight for the PM test runs

4.1 EPA Methods 1, 2 and 3A

EPA Methods 1 and 2 were used to determine stack gas velocity during the EPA Method 5 test runs in order to provide volumetric flow rates for emission rate calculations. EPA Method 1 was used to determine the location of traverse points for EPA Method 2 and for determining the suitability of sampling locations. EPA Method 3A, using integrated bag samples, was used to obtain O_2/CO_2 values in order to calculate molecular weight for Calciner Nos. 1-5. EPA Method 3A using a CEM system was used to determine molecular weight.

Cyclonic flow checks were conducted at each stack during compliance testing. The cyclonic measurement checks were greater than the 20 degree method criterion for Calciner No. 1, demonstrating that the stack flow was cyclonic. Due to the presence of cyclonic flow, the 'alignment method' from EPA Guideline Document 8 - for Particulate Sampling in Cyclonic Flow procedures, was followed. The sample probe was turned into the flow at the average angle for each of the four stack quadrants. Calciners Nos. 2-6 were determined to be not cyclonic and were sampled per EPA Method 2 specifications.

EPA Method 2 was used to determine stack gas velocity with S-type pitot probes. The probe dimensions were verified to be within the design specifications of EPA Method 2, therefore a pitot tube coefficient of 0.84 was assumed. Field data sheets are presented in the Appendix A.

4.2 EPA Method 5

Emissions of filterable particulate matter were measured by EPA Method 5. Gas was withdrawn from the stack isokinetically at sampling points determined using EPA Method 1. Particulate

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matter was collected on a glass fiber filter maintained at 248 ±25°F. The nozzle and probe liner were rinsed with acetone.

4.3 EPA Method 13B

EPA Method 13B was used to determine the total fluoride (F^-) content of the flue gas. EPA Method 13B was used in conjunction with EPA Methods 1, 2 and 4. All samples were collected according to isokinetic conditions. The impinger solutions were distilled deionized (DI) H_2O in a series of three impingers. A Whatman # 1 filter was placed in a 2½-inch filter holder between the 3rd and 4th impingers per Method specifications. The glass components prior to the filter were rinsed with DI water during the sample train recovery process. The filter was recovered with the impinger contents and rinses into a single polyethylene sample container for total fluoride analysis by specific ion electrode. The fluoride analysis was conducted onsite by PCS laboratories.

4.4 EPA Method 30B

EPA Method 30B was performed to determine the vapor phase of total mercury mass concentration using sorbent trap sampling. A volume of flue gas was extracted at a flow rate of 0.75 liters per minute (lpm) and collected on paired trains to determine precision and verify acceptability of measured concentrations. Emissions calculations were determined by following the procedures in EPA Method 30B Section 12.0. Analytical analysis for EPA Method 30B Hg analysis was performed by direct thermal analysis from an Ohio Lumex analyzer in the AECOM Hg Laboratory. Equipment calibration data sheets can be found in Appendix C.

During 30B Hg testing, Method 3A was used for oxygen measurement. Integrated bags samples were used initially for collection followed by instrument analysis. During the test program a full Method 3A with direct analysis using the system below was implemented for enhanced quality control and process monitoring:

Sample Probes

The sampling probe was constructed of stainless steel, with a particulate matter filter at the probe opening.

Heated Lines

Heated sample lines were used to transfer the flue gas samples to the instrument trailer. These lines were heated to 250ºF to prevent condensation. All heat traced lines contained two Teflon® tubes. One tube carries the sample and the second tube was for calibration and leak checks. Sample line temperatures were monitored with Type K thermocouples. A heated-head pump pulled the sample through the heated lines and exhausts the sample to the gas conditioning system.

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Gas Conditioning

A condenser style gas conditioning system was used to separate the moisture from the flue gas. The conditioning system cools the gas to 34ºF and condenses moisture in the sample using glass-chilled cyclones. Condensate was immediately removed from the sample path through a continuous drain, reducing the potential for sample bias. Additionally, the system operates under positive pressure, eliminating the possibility of a leak. After the sample is dried in the condenser, it passes through a 5-micron filter to remove any particulate matter remaining in the gas stream.

Calibration

The EPA reference methods require that a linearity check be performed once prior to testing at a facility. A three-point linearity test was performed at the beginning of the test day. Zero and span gases were introduced through a calibration valve at the probe to establish the calibration curve. Then, the mid-range gas was introduced as a QC check. The analyzers were calibrated with Protocol 1 calibration gases.

A QC check for instrument drift was performed after each one hour test run using zero and mid-range gases. Gases were introduced through the entire sampling system for each drift check. The instrument responses were compared to the pretest calibration value. Results for calibration error and drift and bias checks can be found in Appendix A.

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5.0 QUALITY ASSURANCE / QUALITY CONTROL (QA/QC)

5.1 Field Sampling QA/QC

Table 5-1 summarizes the Quality Assurance and Quality Control (QA/QC) requirements for the field sampling. All of the QA/QC requirements of the test methods were met.

Table 5-1. Sampling QA/QC Requirements

QA/QC Parameter		Requirement	Requirement Met Or Exceptions
EPA Method 1	Upstream and Downstream Distances from Flow Disturbances	> 2 diameters downstream and > 0.5 diameters upstream	Met
EPA Method 2	Manometer Leak Check	No leaks at > 3" water column	Met
	Passing Pitot Tube Inspection	Dimensions specified in EPA Method 2	Met
EPA Method 5	Manometer Leak Check	No leaks at 3" water column	Met
	Sampling System Leak Check	< 4% of sampling rate (or < 0.02 cfm); ≥ 15" Hg vacuum	Met
	Dry Gas Meter Calibration Factor (Y_d), Initial	0.95 – 1.05	Met
	Dry Gas Meter Calibration Factor (Y_d), Final	Initial Y_d ± 5%	Met
	Isokinetic Sampling	100 % ± 10%	Met
	Impinger Condenser/Silica Gel Exit Temperature	< 20°C (68°F)	Met

5.2 EPA Method 30B QA/QC

EPA Method 30B data quality is measured by multiple criteria for sampler console operation. Table 5-2 contains the QA/QC requirements for EPA Method 30B field testing.

Table 5-2. EPA Method 30B Field Sampling QA/QC

QA/QC Parameter	Requirement	Status
Gas flow meter calibration (at 3 settings or points)	Calibration factor (Yi) at each flow rate must be within ±2% of the average value (Y)	Met
Gas flow meter post-test calibration check (Single-point)	Calibration factor (Y_i) must be within ± 5% of the Y value from the most recent 3-point calibration	Met
Temperature sensor calibration	Absolute temperature measured by sensor within ±1.5% of a reference sensor	Met
Barometer calibration	Absolute pressure measured by instrument within ± 10 mm Hg of reading with a mercury barometer	Met
Pre-test leak check	≤ 4% of target sampling rate	Met
Post-test leak check	≤ 4% of target sampling rate	Met

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EPA Method 30B data quality (precision and accuracy) is measured by multiple criteria during analysis. Table 5-3 contains the laboratory QA/QC for EPA Method 30B. Detailed lab analysis and associated QA can be found in Appendix E.

Table 5-3. EPA Method 30B Analysis QA

QA/QC Parameter	Requirement	Result [a]
Multipoint analyzer calibration	Each analyzer reading within ±10% of true value and $r^2 \geq 0.99$	Met
Analysis of continuing calibration verification standard (CCV)	Within ±10% of true value	Met
Sorbent trap section 2 breakthrough	≤10% of Section 1 Hg mass for Hg concentrations >1µg/dscm; ≤20% of Section 1 Hg mass for Hg concentrations ≤1µg/dscm	Met with Exceptions [b]
Paired sorbent trap agreement	≤10% Relative Deviation (RD) mass for Hg concentrations >1µg/dscm; ≤20% (RD) mass for Hg concentrations ≤1µg/dscm;	Met
Sample analysis	Within valid calibration range	Met
Sample analysis	Within bounds of Hg^0 and $HgCl_2$ analytical bias test	Met
Spike recovery (Field recovery test)	Average recovery between 85% and 115% for Hg^0	Met

[a] Calciner Nos. 1 and 3 did not pass all laboratory requirements. See details in the Laboratory analytical summary sheets in the appendices.

[b] Some sorbent tubes were noted as containing noticeable moisture, which is suspect of contributing to higher than desired breakthrough. The paired traps indicated that in those cases, precision was acceptable.

5.3 EPA Method 5 and 13B QA/QC

AECOM reduced and validated all of the sampling and field measurement data collected. The collected field and laboratory data were reviewed for correctness and completeness.

PCS analyzed the EPA Method 13B samples for fluoride. Enthalpy Analytical Inc. of Durham, North Carolina performed analysis for PM. Collected field samples were transported by AECOM under standard chain of custody procedures to the analytical lab. The complete analytical results are contained in Appendix E along with supporting QA/QC analytical data. All field samples were above the analytical detection limit.

5.3.1 Audit Samples

Audit samples through the Source Sampling Audit Sample (SSAS) program were acquired from an Accredited Audit Sample Provider (AASP). The SSAS were analyzed in conjunction with the field samples in the laboratory. Table 5-4 summarizes the results PCS generated based on the

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SSAS that was sent from the AASP as well as which sources samples were analyzed with audit samples.

Table 5-4. Audit Sample Results

Parameter	SSAS ID #	Source ID	Units	Laboratory Result	Acceptable Range	Assigned Value
Fluoride	011216A	EP - 204	mg/dscm	0.961	0.850 - 1.15	Acceptable
	011216B	EP - 203		6.76	5.95 – 8.05	Acceptable

5.3.2 PM Sampling QA/QC

Pretest multi-point flow calibrations and post-test flow calibration checks were performed on the gas sampling meter and all calibration checks met EPA Method 5 criteria. All pre- and post-test meter console calibration data are provided in Appendix C.

Leak checks of each sampling system were performed before and after each test run. The results of leak checks for all runs met the acceptance criteria of EPA Method 5. All samples were collected isokinetically.

All sampling system components that contacted the samples and all equipment used in sampling and recovery operations were cleaned according to the procedures described in EPA Method 5, per 40 CFR part 60 Appendix A. Samples were delivered promptly from the field to the analytical laboratory.

5.4 Deviations and Corrective Action

During the second test run for each calciner, water washing was performed while PM testing was conducted per standard practice for this source. This resulted in higher PM emissions for the second run on each calciner stack. Emission limits were not exceeded as a result.

The first PM test run on Calciner 2 failed the post-test leak check, therefore an additional (4^{th}) test run was conducted.

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APPENDIX A
DETAILED SUMMARY OF EMISSION RESULTS

A-1 Calciner No. 1

PCS Phosphate Operations - Stack Test Results

Green indicates hard entry

Test Information

Location	Calciner No. 1
Product	Single Float Calcined Rock
Source	WESP
Stack ID No	201
Start Date	5/22/2015
Pollutant	Particulate
Method	5/202

Production Data

Date	5/21/2015	5/22/2015
Feed Rate, Wet, TPH (During Test)	70.0	70.0
Bulk Moisture of Rock (Lab Analyses)	11.29%	10.57%
Rock Feed Rate Dry, TPH	62.1	62.6
Lbs. Coal/Ton of Dry Feed	55.9	55.9
Coal Feed, TPH	1.74	1.75
Process Weight Rate, TPH	63.8	64.4
Loss On Ignition	5.81%	5.81%
Production Rate During Test, TPH Product	58.5	59.0

Test Parameters/Conditions

	3	4	5	Average
Time of Start	12:45	09:50	11:40	N/A
Time of Finish	14:01	11:05	12:54	N/A

Stack Gas Flow Rate Calculations

Stack Flow Rate, DSCFM	35,359	39,538	38,474	37,790
Sample Volume (DSCF)	50.326	52.962	49.388	50.892

Condensable

Particulate Determination, Inorganic Fraction

	Run 3	Run 4	Run 5	Average
Net Sample Weight, mg	3.91	2.58	2.26	2.917

Condensable

Particulate Determination, Organic Fraction

Net Sample Weight, mg	3.67	1.15	1.88	2.233
Train Blank, mg		3.23		N/A
CPM, mg/DSCF	0.1109	0.0327	0.0433	0.0623

Particulate Determination, Filterable

Beaker Final Weight, mg	2.13	1.63	1.60	1.7867
Final Filter Weight, mg	5.90	99.31	12.48	39.2300
Net Sample Weight, mg	8.03	100.94	14.08	41.0167
Mg Particulate/DSCF	0.1596	1.9059	0.2851	0.7835
Mg Particulate/DSCF, Averaged for Wash Cycle Procedures				0.3065
grams/DSCM	0.0056	0.0673	0.0101	0.0277

Total Particulate Determination

PM Emission Rate, Lbs./Hr - Filterable	0.75	9.97	1.45	4.05
PM Emission Rate, Lbs./Hr - Condensable-Inorganic	0.36	0.25	0.23	0.28
PM Emission Rate, Lbs./Hr - Condensable-Organic	0.34	0.11	0.19	0.22
PM Emission Rate, Lbs./Hr -Total Condensable (corrected with train blank)	0.52	0.17	0.22	0.30
PM Emission Rate, Lbs./Hr - Total Particulate	1.26	10.14	1.67	4.36
Average Daily PM Emission Rate, Lbs./Hr - Filterable				1.542
Average Daily PM Emission Rate, Lbs./Hr -Condensible				0.360
Average Daily PM Emission Rate, Lbs./Hr - Total Particulate				1.902
PM Emission Rate, Lbs./Day				45.640
PM Emission Rate, grams/dscm				0.0108
PM Emission Rate, grains/dscf				0.005
Allowable PM Rate, grain/dscf				0.080

Data For Avg Daily Emission Rate Calculation (inputs in red cells only)

Total PM lbs/hr

Total PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	10.14
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Total PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.47

Filterable PM lbs/hr

Filterable PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	9.97
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.10

Condensible PM lbs/hr

Condensible PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	0.17
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Condensible PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	0.37

PM Emission rate g/dscm

Filterable PM g/dscm Run with wash (enter cell address) ($E_{s)}$	0.07
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM g/dscm Avg of two non-wash runs (enter cell addresses)(E_N)	0.01

PM Emission rate mg/dscf

Filterable PM mg/dscf Run with wash (enter cell address) ($E_{s)}$	1.91
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM mg/dscf Avg of two non-wash runs (enter cell addresses)(E_N)	0.22

***Water Wash Performed on Run 2**

(R=24hrs)

$E_{avg} = E_s S\,(A+B)/AR) + E_N\,(((R-S)/R)-(BS/AR))$

AECOM

Emissions Test Run Summary

Facility:	**PCS**
Location:	**Calciner #1**
Condition	**Normal**
Sample Type:	**Method 13B**

Was the run used?	Yes	Yes	Yes	
Run Number:	1	2	3	
Date:	10-Feb-16	10-Feb-16	10-Feb-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	29.85	29.79	29.77	29.80
Absolute Stack Pressure (in Hg)	29.83	29.77	29.75	29.79
Stack Static Pressure (in H2O)	-0.24	-0.24	-0.24	-0.24
Average Stack Temperature (°F)	146.3	149.8	148.1	148.1
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	44.411	44.465	46.539	45.138
Average Meter Pressure (in H2O)	1.39	1.29	1.46	1.38
Average Meter Temperature (°F)	45.5	62.6	59.4	55.9
Moisture Collected (g)	386.3	384.5	388.2	386.3
Carbon Dioxide Concentration (%V)	6.3	6.3	6.3	6.3
Oxygen Concentration (%V)	15.1	15.1	15.1	15.1
Nitrogen Concentration (%V)	78.7	78.7	78.7	78.7
Dry Gas Meter Factor (γ_δ)	0.9943	0.9943	0.9943	0.9943
Nozzle Diameter (in)	0.269	0.269	0.269	0.269
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.641	0.620	0.653	0.638
Standard Metered Volume (dscf)	46.169	44.638	47.001	45.936
Standard Metered Volume (dscm)	1.307	1.264	1.331	1.301
Stack Moisture (%V)	28.3	28.9	28.0	28.4
Saturated Moisture (%V)	23.0	24.8	24.2	24.0
Mole Fraction Dry Stack Gas	0.770	0.752	0.758	0.760
Dry Molecular Weight	29.61	29.61	29.61	29.61
Wet Molecular Weight	26.94	26.73	26.80	26.82
Average SQRT of Delta P	0.68	0.66	0.69	0.68
Stack Gas Velocity (fps)	35.9	35.1	37.1	36.1
Stack Gas Velocity (mpm)	11.0	10.7	11.3	11.0
Volumetric Flow Rate (acfm)	60979	59610	62885	61158
Volumetric Flow Rate (acmm)	1727	1688	1781	1732
Volumetric Flow Rate (dscfm)	40785	38614	41144	40181
Volumetric Flow Rate (dscmm)	1155	1094	1165	1138
Percent Isokinetic	96.4	98.4	97.2	97.3
Post Test Meter QA (γ_{qa})	1.031	1.010	1.023	1.021

Fluoride Emission Rate Calculations

				Average
Orion 901 Meter Reading, ppm	0.26	0.18	0.26	N/A
Liquid Sample Volume, ml	1000	1000	1000	N/A
Sample Aliquot	10	10	10	N/A
Sample Dilution	10	10	10	N/A
Total Fluoride, mg	0.2610	0.1800	0.2560	0.2323
Fluoride Concentration, mg/DSCF	0.0057	0.0040	0.0054	0.0050
Fluoride Emissions, lbs F/hr	0.0305	0.0206	0.0296	0.0269
Rock Feed (Wet TPH)	69.98	69.98	69.98	70.0
Fluoride Emissions, lbs F/Ton Rock Feed	0.0004	0.0003	0.0004	0.0004

Run Used:	Yes
Correction for Cyclonic Flow:	Yes

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS
Project Number	60402248
Sampling Location	Calciner #1
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	29.95

O2/CO2 Method Orsat

	CO2 Percent	O2 Percent
Replicate 1	6.3	15.1
Replicate 2		
Replicate 3		
Average	6.3	15.1

N2 Percent: 78.7

Date	2/10/2016
Operator	RLM/WL
Run Number	1
K Factor	3.20
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Port Height (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	C
Stack Diameter (or Length) (in)	72.0
Stack Width (If Rectangle) (in)	
Nozzle ID 1 (in)	0.264
Nozzle ID 2 (in)	0.273
Nozzle ID 3 (in)	0.269
Nozzle ID (in)	0.269

Impinger Weights (g)

	Initial	Final	Net Gain
Impinger 1	635.4	898	262.6
Impinger 2	724.8	825.9	101.1
Impinger 3	656.1	665.9	9.8
Impinger 4	881.1	893.9	12.8
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			386.3

Saturated Percent Moisture	22.97	Standard
Calculated Percent Moisture	28.29	Volume (dscf)
Isokinetic %	96.4	46.2

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔR) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)	Refer to Cell A2 for use of calc cyclonic flow Yaw Angle (deg)
A1	0	11:10:00	973.308	0.66	1.98	143	37	36	43
A2	3	11:13:00	975.470	0.68	2.04	147	41	37	36
A3	6	11:16:00	977.720	0.60	1.80	150	43	37	40
A4	9	11:19:00	979.760	0.59	1.77	145	45	37	43
A5	12	11:22:00	981.810	0.53	1.59	145	46	37	31
A6	15	11:25:00	983.790	0.48	1.44	150	48	39	26
A7	18	11:28:00	985.655	0.48	1.44	142	48	39	8
A8	21	11:31:00	987.510	0.47	1.41	149	49	40	15
A9	24	11:34:00	989.380	0.39	1.17	143	49	41	15
A10	27	11:37:00	991.110	0.40	1.20	147	49	41	12
A11	30	11:40:00	992.780	0.40	1.20	148	50	42	12
A12	33	11:43:00	994.490	0.41	1.23	147	50	42	16
STOP	36	11:46:00	996.193						
B1	36	11:50:00	996.193	0.48	1.44	149	48	43	46
B2	39	11:53:00	998.150	0.49	1.47	138	48	43	48
B3	42	11:56:00	1000.040	0.49	1.47	147	49	43	55
B4	45	11:59:00	1001.940	0.42	1.26	149	50	43	66
B5	48	12:02:00	1003.730	0.36	1.08	146	53	45	41
B6	51	12:05:00	1005.440	0.30	0.90	149	54	45	11
B7	54	12:08:00	1006.990	0.35	1.05	147	55	46	7
B8	57	12:11:00	1008.710	0.43	1.29	142	54	46	6
B9	60	12:14:00	1010.410	0.42	1.26	147	54	46	13
B10	63	12:17:00	1012.200	0.45	1.35	148	53	46	10
B11	66	12:20:00	1014.000	0.42	1.26	142	53	46	28
B12	69	12:23:00	1015.850	0.44	1.32	151	53	47	7
STOP	72	12:26:00	1017.719						

Run Used:	Yes
Correction for Cyclonic Flow:	Yes

Enter data in unshaded areas.

Sample Type	Method 13
Client/Plant	PCS
Project Number	60402248
Sampling Location	Calciner #1
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	29.89

Date	2/10/2016	
Operator	RLM/WL	
Run Number	2	
K Factor	3.00	
Meter $\Delta H_@$	1.7992	
Pitot Constant	0.84	
Port Height (ft)	100	
Static Pressure (Ps)	-0.24	
Stack Geometry (R or C)?	C	
Stack Diameter (or Length) (in)	72.0	
Stack Width (If Rectangle) (in)		
Nozzle ID 1 (in)	0.264	
Nozzle ID 2 (in)	0.273	
Nozzle ID 3 (in)	0.269	
Nozzle ID (in)	0.269	

O2/CO2 Method: Orsat

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.3	15.1	
Replicate 2			
Replicate 3			
Average	6.3	15.1	78.7

Impinger Weights (g)

	Initial	Final	Net Gain
Impinger 1	742.9	994.6	251.7
Impinger 2	662.6	767.4	104.8
Impinger 3	642.4	655.4	13
Impinger 4	891	906	15
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			384.5

Saturated Percent Moisture	24.80	Standard
Calculated Percent Moisture	28.88	Volume (dscf)
Isokinetic %	98.4	44.6

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head ($\Delta\bar{P}$) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)	>0 indicates Cyclonic Flow Yaw Angle (deg)
A1	0	13:05:00	18.589	0.57	1.71	150	54	57	43
A2	3	13:08:00	20.680	0.46	1.38	150	55	62	36
A3	6	13:11:00	22.570	0.42	1.26	142	55	64	40
A4	9	13:14:00	24.350	0.35	1.05	149	55	64	43
A5	12	13:17:00	26.040	0.27	0.81	144	56	67	31
A6	15	13:20:00	27.540	0.36	1.08	150	56	64	26
A7	18	13:23:00	29.210	0.42	1.26	149	65	57	8
A8	21	13:26:00	31.010	0.42	1.26	152	65	57	15
A9	24	13:29:00	32.790	0.45	1.35	152	66	57	15
A10	27	13:32:00	34.680	0.40	1.20	149	66	59	12
A11	30	13:35:00	36.470	0.42	1.26	153	65	58	12
A12	33	13:38:00	38.300	0.47	1.26	147	69	59	16
STOP	36	13:41:00	40.081						
B1	36	13:44:00	40.081	0.51	1.53	149	69	59	46
B2	39	13:47:00	42.010	0.51	1.53	151	65	61	48
B3	42	13:50:00	44.100	0.47	1.41	151	69	62	55
B4	45	13:53:00	46.560	0.44	1.32	152	69	62	66
B5	48	13:56:00	48.590	0.42	1.26	146	69	62	41
B6	51	13:59:00	50.260	0.39	1.17	152	69	63	11
B7	54	14:02:00	52.040	0.45	1.35	156	68	64	7
B8	57	14:05:00	53.880	0.45	1.35	152	68	64	6
B9	60	14:08:00	55.720	0.44	1.32	149	68	64	13
B10	63	14:11:00	57.590	0.42	1.26	153	68	63	10
B11	66	14:14:00	59.400	0.39	1.17	147	64	62	28
B12	69	14:17:00	61.210	0.45	1.35	151	62	61	7
STOP	72	14:20:00	63.054						

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Run Used:	Yes
Correction for Cyclonic Flow:	Yes

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS
Project Number	60402248
Sampling Location	Calciner #1
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.00
Barometric Pressure	29.87

O2/CO2 Method Orsat

	CO2 Percent	O2 Percent
Replicate 1	6.3	15.1
Replicate 2		
Replicate 3		
Average	6.3	15.1

N2 Percent: 78.7

Date	2/10/2016
Operator	RLM/WL
Run Number	3
K Factor	3.20
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Port Height (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	C
Stack Diameter (or Length) (in)	72.0
Stack Width (If Rectangle) (in)	
Nozzle ID 1 (in)	0.264
Nozzle ID 2 (in)	0.273
Nozzle ID 3 (in)	0.269
Nozzle ID (in)	0.269

Impinger Weights (g)

	Initial	Final	Net Gain
Impinger 1	625	898.5	273.5
Impinger 2	749.8	847.3	97.5
Impinger 3	657.2	663.8	6.6
Impinger 4	890.4	901	10.6
Impinger 5			0
Impinger 6			0
Impinger 7			0
Impinger 8			0
Moisture Collected (g)			388.2

Saturated Percent Moisture	24.21	Standard
Calculated Percent Moisture	28.03	Volume (dscf)
Isokinetic %	97.2	47.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔR) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)	>0 indicates Cyclonic Flow Yaw Angle (deg)
A1	0	14:40:00	63.305	0.70	2.10	148	50	52	43
A2	3	14:43:00	65.610	0.68	2.04	150	63	59	36
A3	6	14:46:00	67.920	0.65	1.95	150	66	59	40
A4	9	14:49:00	70.110	0.57	1.71	148	66	60	43
A5	12	14:52:00	72.230	0.57	1.71	149	67	60	31
A6	15	14:55:00	74.400	0.52	1.56	148	65	59	26
A7	18	14:58:00	76.380	0.45	1.35	149	65	60	8
A8	21	15:01:00	78.240	0.45	1.50	148	62	60	15
A9	24	15:04:00	80.220	0.48	1.35	147	63	59	15
A10	27	15:07:00	82.100	0.42	1.44	144	63	58	12
A11	30	15:10:00	84.970	0.42	1.26	150	63	58	12
A12	33	15:13:00	85.810	0.46	1.26	152	62	57	16
STOP	36	15:16:00	87.661						
B1	36	15:20:00	87.661	0.55	1.69	147	63	58	46
B2	39	15:23:00	89.650	0.52	1.56	150	63	58	48
B3	42	15:26:00	91.680	0.45	1.35	143	62	58	55
B4	45	15:29:00	93.530	0.39	1.17	149	62	58	66
B5	48	15:32:00	95.260	0.32	0.96	147	62	58	41
B6	51	15:35:00	96.920	0.35	1.05	145	62	59	11
B7	54	15:38:00	98.590	0.45	1.35	144	58	56	7
B8	57	15:41:00	100.114	0.46	1.38	149	58	55	6
B9	60	15:44:00	102.350	0.48	1.44	150	56	54	13
B10	63	15:47:00	104.270	0.42	1.26	150	56	54	10
B11	66	15:50:00	106.100	0.44	1.32	150	59	55	28
B12	69	15:53:00	107.970	0.44	1.32	148	56	55	7
STOP	72	15:56:00	109.844						

AECOM

EPA Method 30B Emission Results

PCS Phosphate
Calciner #1
Mercury
Emission Calculations

O_2 Correction Basis: 3

Pollutant: Mercury

Run	Total Hg Catch ng	Sample Volume dscm	Hg Concentration mg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration mg/dscm @ 3%	Flow Rate dscfm
1	2810	0.058	0.0488	0.0059	15.05	0.149	46,173
2	2642	0.053	0.0500	0.0060	15.05	0.153	45,200
3	2682	0.057	0.0470	0.0056	15.05	0.144	47,081
AVERAGE	**2711**	**0.056**	**0.0486**	**0.0058**	**15.05**	**0.149**	**46,151**

Method 2 Velocity Traverse

Run Number	1
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #1
Condition	Normal
Static Pressure (Ps)	-0.24
Location Height (ft)	100
Barometric Pressure	30.23

Date	2/11/2016
Operator	CB/DM
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	30.13
Abs. Stack Press. (in. Hg)	30.11

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.27	15.05	
Replicate 2			
Replicate 3			
Average	6.27	15.05	78.7

Moisture By: Saturation

Saturated Percent Moisture	24.52
Calculated Percent Moisture	24.52
Mole Frac of Dry Stack Gas	0.755
Average MW of Dry Gas	29.61
Average MW of Wet Gas	26.76

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.50	148	0.707	44.1
2	0.56	149	0.748	46.7
3	0.54	151	0.735	46.0
4	0.52	154	0.721	45.2
5	0.40	148	0.632	39.5
6	0.40	148	0.632	39.5
7	0.38	148	0.616	38.5
8	0.44	147	0.663	41.3
9	0.43	146	0.656	40.8
10	0.43	144	0.656	40.8
11	0.45	151	0.671	41.9
12	0.46	153	0.678	42.5
B1	0.48	146	0.693	43.1
2	0.41	151	0.640	40.0
3	0.50	153	0.707	44.3
4	0.46	154	0.678	42.5
5	0.40	149	0.632	39.5
6	0.36	147	0.600	37.4
7	0.35	149	0.592	36.9
8	0.38	144	0.616	38.3
9	0.45	147	0.671	41.8
10	0.47	151	0.686	42.9
11	0.42	152	0.648	40.6
12	0.37	149	0.608	38.0
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		149.13	0.66	41.34

Act Volumetric Flow Rate (acfm)	70125
Std. Volumetric Flow Rate (scfm)	61177
Dry Volumetric Flow Rate (dscfm)	46173

Method 2 Velocity Traverse

Run Number	2
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #1
Condition	Normal
Static Pressure (Ps)	-0.24
Location Height (ft)	100
Barometric Pressure	30.21

Date	2/11/2016
Operator	CB/DM
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	30.11
Abs. Stack Press. (in. Hg)	30.09

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.27	15.05	
Replicate 2			
Replicate 3			
Average	6.27	15.05	78.7

Moisture By: Saturation

Saturated Percent Moisture	23.94
Calculated Percent Moisture	23.94
Mole Frac of Dry Stack Gas	0.761
Average MW of Dry Gas	29.61
Average MW of Wet Gas	26.83

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.46	147	0.678	42.2
2	0.48	148	0.693	43.2
3	0.49	150	0.700	43.7
4	0.50	153	0.707	44.2
5	0.47	149	0.686	42.8
6	0.44	148	0.663	41.3
7	0.42	149	0.648	40.4
8	0.41	146	0.640	39.8
9	0.43	145	0.656	40.8
10	0.40	143	0.632	39.3
11	0.39	149	0.624	39.0
12	0.39	151	0.624	39.0
B1	0.30	147	0.548	34.1
2	0.38	150	0.616	38.5
3	0.44	154	0.663	41.5
4	0.40	154	0.632	39.6
5	0.36	148	0.600	37.4
6	0.31	146	0.557	34.6
7	0.35	150	0.592	36.9
8	0.41	146	0.640	39.8
9	0.44	147	0.663	41.3
10	0.46	150	0.678	42.3
11	0.46	152	0.678	42.4
12	0.40	147	0.632	39.4
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		148.71	0.64	40.15

Act Volumetric Flow Rate (acfm)	68118
Std. Volumetric Flow Rate (scfm)	59427
Dry Volumetric Flow Rate (dscfm)	45200

Method 2 Velocity Traverse

Run Number	3
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #1
Condition	Normal
Static Pressure (Ps)	-0.24
Location Height (ft)	100
Barometric Pressure	30.16

Date	2/11/2016
Operator	CB/DM
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	30.06
Abs. Stack Press. (in. Hg)	30.04

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.27	15.05	
Replicate 2			
Replicate 3			
Average	6.27	15.05	78.7

Moisture By: Saturation

Saturated Percent Moisture	23.98
Calculated Percent Moisture	23.98
Mole Frac of Dry Stack Gas	0.760
Average MW of Dry Gas	29.61
Average MW of Wet Gas	26.82

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.52	145	0.721	44.9
2	0.51	147	0.714	44.5
3	0.49	147	0.700	43.6
4	0.45	151	0.671	41.9
5	0.45	150	0.671	41.9
6	0.37	152	0.608	38.1
7	0.42	150	0.648	40.5
8	0.50	147	0.707	44.1
9	0.50	146	0.707	44.0
10	0.49	143	0.700	43.5
11	0.51	148	0.714	44.5
12	0.51	150	0.714	44.6
B1	0.35	147	0.592	36.9
2	0.44	151	0.663	41.5
3	0.43	154	0.656	41.1
4	0.36	154	0.600	37.6
5	0.33	149	0.574	35.9
6	0.36	146	0.600	37.4
7	0.43	148	0.656	40.9
8	0.51	147	0.714	44.5
9	0.53	148	0.728	45.4
10	0.52	152	0.721	45.1
11	0.50	150	0.707	44.2
12	0.40	149	0.632	39.5
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		148.79	0.67	41.92

Act Volumetric Flow Rate (acfm)	71117
Std. Volumetric Flow Rate (scfm)	61932
Dry Volumetric Flow Rate (dscfm)	47081

AECOM

METHOD 30B

Run No. 1

Date	2/11/2016		Sorbent Trap Number	OL304567	Meter Number	8002547		
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180		
Location	Calciner #1		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180		
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72		
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %			
Operator	DM		Minutes Per Point		K-factor			
Location Height			Ambient Temp. (F)		O2 %			
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%			
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	30.13	O2/CO2 Method			

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	10:25:00	0.000		0.75	152	245	33	33	228	2
	5	10:30	4.56		0.75	152	268	35	35	235	3
	10	10:35	9.01		0.75	146	250	36	36	240	3
	15	10:40	12.95		0.75	152	272	34	33	237	3
	20	10:45	16.74		0.75	152	257	34	34	237	3
	25	10:50	20.52		0.75	147	240	34	34	236	3
	30	10:55	25.03		0.75	152	272	34	34	236	3
	35	11:00	30.12		0.75	150	243	34	34	235	3
	40	11:05	35.16		0.75	153	268	34	34	235	3
	45	11:10	40.11		0.75	152	239	34	34	236	3
	50	11:15	43.76		0.75	152	267	34	34	235	3
	55	11:20	47.77		0.75	145	237	34	34	235	3
	60	11:25	52.628		0.75	146	265	34	34	236	3
TOTAL			52.628	52.6280	0.75	151	256	34	34	235	3
Target Volume											
Spike Amount (ng)	2000										

Comments: Stack Temp for Run 1A and 1B is an average of Runs 2 and 3.

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**57647.1734**	**57.6471734**

AECOM

METHOD 30B

Run No. 1

Date	2/11/2016		Sorbent Trap Number	OL321213	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0280	
Location	Calciner #1		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0280	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	18	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	30.13	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	10:25:00	0.000		0.75	152	245	33	33	228	3
	5	10:30	4.89		0.75	152	268	35	33	235	4
	10	10:35	9.03		0.75	146	250	36	33	240	4
	15	10:40	13.50		0.75	152	272	34	33	237	4
	20	10:45	17.68		0.75	152	257	34	33	237	4
	25	10:50	21.81		0.75	147	240	34	34	236	4
	30	10:55	25.73		0.75	152	272	34	34	236	4
	35	11:00	29.62		0.75	150	243	34	34	235	4
	40	11:05	33.95		0.75	153	268	34	34	235	4
	45	11:10	38.34		0.75	152	239	34	34	236	4
	50	11:15	42.89		0.75	152	267	34	34	235	4
	55	11:20	47.27		0.75	145	237	34	34	235	4
	60	11:25	51.969		0.75	146	265	34	34	236	4
TOTAL			51.969	51.969	0.75	151	256	34	34	235	4
Target Volume											
Spike Amount (ng)											

Comments: Stack Temp for Run 1A and 1B is an average of Runs 2and 3.

	Mechanical	Totalizer
Total Volume (L)	**57484.51192**	**57.4845119**

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AECOM

METHOD 30B

Run No. 2

Date	2/11/2016		Sorbent Trap Number	OL306813	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #1		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	8	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	30.11	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:00:00	0.000		0.75	156	267	34	34		-6
	5	12:05	6.73		0.75	151	258	35	34		-3
	10	12:10	10.87		0.75	145	269	34	34		-3
	15	12:15	14.38		0.75	153	257	35	34		-3
	20	12:20	17.92		0.75	153	256	35	34		-3
	25	12:25	22.10		0.75	145	271	34	35		-3
	30	12:30	25.85		0.75	152	283	35	35		-3
	35	12:35	29.82		0.75	154	280	35	35		-3
	40	12:40	33.52		0.75	150	274	35	35		-3
	45	12:45	36.83		0.75	158	268	36	35		-3
	50	12:50	40.21		0.75	143	272	35	35		-3
	55	12:55	44.05		0.75	150	271	36	36		-3
	60	13:00	48.298		0.75	153	249	36	38		-3
TOTAL			48.2980	48.2980	0.75	151	267.31	35.00	34.92		-3.23
Target Volume											
Spike Amount (ng)	2000										
Comments:											

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**52778.6658**	**52.7786658**

AECOM

METHOD 30B

Run No. 2

Date	2/11/2016		Sorbent Trap Number	OL321115	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0280	
Location	Calciner #1		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0280	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	8	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	30.11	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
A1	0	12:00:00	0.000		0.75	156	267	35	35		-6
	5	12:05	6.830		0.75	151	258	35	35		-3
	10	12:10	11.230		0.75	145	269	34	35		-3
	15	12:15	14.890		0.75	153	257	35	35		-3
	20	12:20	18.880		0.75	153	256	35	35		-3
	25	12:25	23.550		0.75	145	271	34	35		-3
	30	12:30	27.200		0.75	152	283	35	35		-3
	35	12:35	30.890		0.75	154	280	36	35		-3
	40	12:40	34.000		0.75	150	274	35	35		-3
	45	12:45	37.650		0.75	158	268	36	35		-3
	50	12:50	40.850		0.75	143	272	36	35		-3
	55	12:55	44.360		0.75	150	271	36	35		-3
	60	13:00	48.0070		0.75	153	249	36	35		-3
TOTAL			48.0070	48.0070	0.75	151	267.31	35	35.00		-3.23
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**52951.29772**	**52.9512977**

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AECOM

METHOD 30B

Run No. 3

Date	2/11/2016		Sorbent Trap Number	OL304582	Meter Number	8002547	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #1		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	6	Barometric Pres. (" Hg)	30.06	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	13:35:00	0.000		0.75	154	259	40	33	241	3
	5	13:40	4.280		0.75	151	244	39	33	242	3
	10	13:45	8.310		0.75	151	267	39	33	243	2
	15	13:50	12.760		0.75	144	243	39	33	254	3
	20	13:55	16.880		0.75	151	269	40	33	244	3
	25	14:00	20.750		0.75	153	251	37	33	243	3
	30	14:05	24.780		0.75	162	265	37	33	242	3
	35	14:10	28.950		0.75	150	260	36	33	243	3
	40	14:15	33.180		0.75	146	241	36	33	243	3
	45	14:20	37.640		0.75	152	269	38	33	245	3
	50	14:25	42.250		0.75	153	243	38	33	245	3
	55	14:30	46.800		0.75	151	270	37	33	242	3
	60	14:35	51.3130		0.75						
TOTAL			51.3130	51.3130	0.75	152	257	38	33	244	3
Target Volume											
Spike Amount (ng)	2000										

Comments:

	Mechanical	Totalizer
Total Volume (L)	**55642.80284**	**55.6428028**

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AECOM

METHOD 30B

Run No. 3

Date	2/11/2016		Sorbent Trap Number	OL321152	Meter Number	8002511	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.028	
Location	Calciner #1		Nozzle ID (inches)		DGM Cal Factor (Y)	1.028	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	19	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	6	Barometric Pres. (" Hg)	30.06	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	13:35:00	0.000		0.75	154	259	40	33	241	4
	5	13:40	4.590		0.75	151	244	41	33	242	4
	10	13:45	8.550		0.75	151	267	40	33	243	4
	15	13:50	13.840		0.75	144	243	40	33	254	3
	20	13:55	17.510		0.75	151	269	40	33	244	3
	25	14:00	22.860		0.75	153	251	38	33	243	3
	30	14:05	26.420		0.75	162	265	38	33	242	3
	35	14:10	30.850		0.75	150	260	37	33	243	3
	40	14:15	36.360		0.75	146	241	37	33	243	3
	45	14:20	40.680		0.75	152	269	39	33	245	3
	50	14:25	44.970		0.75	153	243	39	33	245	3
	55	14:30	49.350		0.75	151	270	38	33	242	3
	60	14:35	53.6120		0.75						
TOTAL			53.6120	53.6120	0.75	152	256.75	38.92	33.00	243.92	3.25
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**58598.93715**	**58.5989372**

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00246

AECOM

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE 1 OF 1

Client/Plant: DCS	Project #: 60407249.10	Date: 2-11-16	Operator(s): CB / D.M
Location: Calcine #1	Condition: Normal	Moisture Run #:	Duration (min):
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
P_{bar} ("Hg): 29.8	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24	
Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Pitot Tube ID#:	
Fyrite/Orsat O_2 (%/time)	% (:)	% (:)	% (:)	
Fyrite/Orsat CO_2 (%/time)	% (:)	% (:)	% (:)	

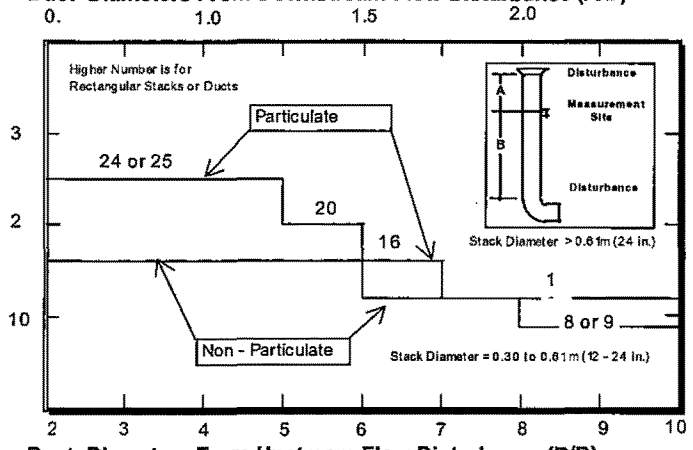
Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #: 2		Flow Run #: 3		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		10:15	10:28	11:45	11:56	13:37	13:42	
						ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					A1	.50	145	0.46	147	.52	148	
					2	.57	149	0.48	148	.57	147	
					3	.54	159	0.49	150	.49	147	
					4	.52	154	0.50	153	.45	151	
					5	.47	148	0.47	149	.45	150	
					6	.50	148	0.44	148	.37	152	
					7	.38	149	0.42	149	.42	150	
					8	.44	147	0.41	146	.50	147	
					9	.43	146	0.43	148	.50	146	
					10	.43	144	0.40	143	.49	143	
					11	.45	151	0.39	149	.51	148	
					12	.46	153	0.39	151	.51	150	
					B1	.48	146	0.30	147	.35	147	
					2	.49	151	0.38	150	.44	151	
					3	.50	153	0.44	154	.43	154	
					4	.46	154	0.40	154	.36	154	
					5	.40	149	0.36	148	.33	149	
					6	.36	147	0.31	146	.36	146	
					7	.35	149	0.35	150	.43	148	
					8	.38	144	0.41	146	.51	147	
					9	.45	147	0.44	147	.53	148	
					10	.47	151	0.46	150	.52	152	
					11	.42	152	0.46	152	.50	150	
					12	.37	149	0.40	147	.40	149	

Comments: Flow Cal #1 H_2O Test

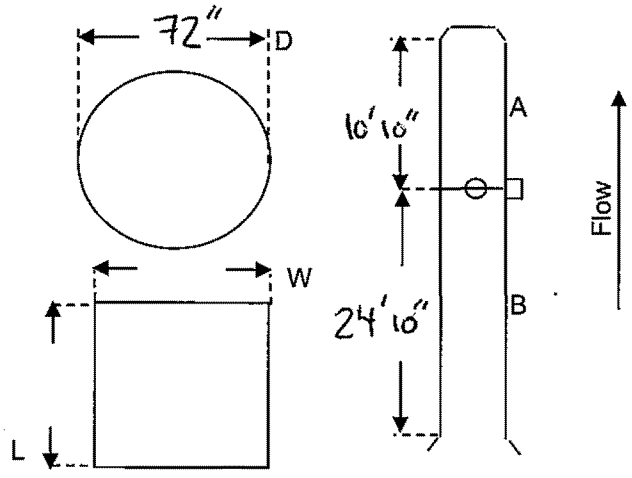
AECOM	FIELD SAMPLING DATA SHEET Sample and Velocity Traverse for Stationary Sources	EPA Method 1

Client / Plant: PCS	Project #: 60407248.10	Location: Calciner #1	Date: 2-10-16
Number of Traverse Points Chosen: 24	Number of Ports: 2		Number of Points per Port: 12

Duct Diameters From Downstream Flow Disturbance (A/D)



Duct Diameters From Upstream Flow Disturbance (B/D)



Deq = 2LW / (L+W)
Dnstream Diameters (A/D) _____
Upstream Diameters (B/D) _____

Cross-Sectional Layout of Rectangular Stacks

Traverse Points	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5

Traverse Point	Fraction of Diameter	Distance From Wall	Nipple Length	Point Location
1	2.1	1.5	5"	6.5
2	6.7	4.9		9.8
3	11.8	8.5		13.5
4	17.7	12.7		17.7
5	25.0	18.0		23.0
6	35.6	25.6		30.6
7	64.4	46.4		51.4
8	75.0	54.0		59.0
9	82.3	59.3		64.3
10	88.2	63.5		68.5
11	93.3	67.2		72.2
12	97.9	70.5		75.2

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINT IN RECTANGULAR STACKS.

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

Test Run 1 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-12-2016 12:44:02	-0.089	-0.223
02-12-2016 12:45:01	-0.098	-0.223
02-12-2016 12:46:01	-0.101	-0.222
Pause		
End Pause		
02-12-2016 12:48:01	19.335*	20.481
02-12-2016 12:49:01	19.364*	20.470
02-12-2016 12:50:01	19.370*	20.475
Pause		
End Pause		
02-12-2016 12:52:02	10.108	9.862
02-12-2016 12:53:02	10.083	9.858
02-12-2016 12:54:02	10.074	9.849
Pause		
End Pause		
02-12-2016 12:57:01	11.601	6.256
02-12-2016 12:58:01	13.823	6.286
02-12-2016 12:59:01	15.687	6.276
02-12-2016 13:00:01	17.115	6.275
Pause		
End Pause		
02-12-2016 13:03:01	15.084	0.767
02-12-2016 13:04:01	15.036	0.666
02-12-2016 13:05:01	15.043	0.471
02-12-2016 13:06:01	15.047	0.393
02-12-2016 13:07:01	15.048	0.388
Run Averages	O2 %	CO2 %
02-12-2016 13:07:12	12.340*	6.866
Operator:	David Marzec	
Plant Name:	PCS Aurora	
Location:	Calciner #1	

Test Run 1 End

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00249

URS

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402240.10	Date: 2-10-16	Operator(s): DM/RC
Location: Calciner #1	Condition: Normal (prelim)	Moisture Run #: Flows only	Duration (min): X
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
P_{bar} ("Hg): 29.7	Height w.r.t. Barometer (ft):	P_{static} ("H_2O):	-.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Pitot Tube ID#:	
Fyrite/Orsat O_2 (%/time)	% (:)	% (:)	% (:)	
Fyrite/Orsat CO_2 (%/time)	% (:)	% (:)	% (:)	

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #:		Flow Run #:		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		8:50	9:22	:	:	:	:	
						ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					A1	.49	146					43
					2	.48	146					36
					3	.48	146					40
					4	.47	147					43
					5	.44	146					31
					6	.43	146					26
					7	.46	147					8
					8	.50	147					8 15
					9	.52	147					15
					10	.51	147					12
					11	.46	147					12
					12	.48	148					16
					B1	.44	150					46
					2	.42	149					46
					3	.44	149					35
					4	.42	149					66
					5	.40	149					41
					6	.33	150					11
					7	.48	150					7
					8	.49	150					6
					9	.50	150					13
					10	.50	150					10
					11	.47	150					28
					12	.43	150					7
					END							

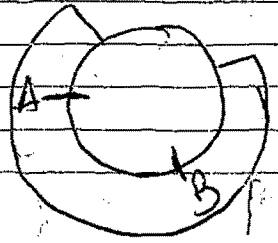
Comments:

Port A Cyc. L = 24.75

Port B Cyc. L = 24.33

36.5
13
44
12

42
149



AECOM

Plant Name	PCS	Date	2-11-16	Page	1 of 1
Project Number	60402248.10	Condition	Normal	Initial Leak Rate	1) Ø @ 20 "Hg
Location (Source)	Calciner #1	Run	#1		2) Ø @ 18 "Hg
Meter ID & Cal Factors	8002547 / 8002511	Operator	DM	Final Leak Rate	1) @ "Hg
Sorbent Trap IDs	1) OL304567 spike	Bar. Press. (in. H_2O)			2) @ "Hg
	2) OL321213	Elevation (relative to Barometer) (ft)	100	Third Bed Spike Level	1) 2000 ng spike
	Stack(Fd)				2)

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F)				Vacuum (in. Hg)
					Sorbent	Chiller	Heat-Traced Line	Meter	
1)	1025	0.000	.75	152	245	33	228	33	2
2)		0.000	.75					33	3
1)	1030	4.56	.75	152	248	33	235	35	3
2)		4.59	.75					34	4
1)	1035	9.01	.75	146	250	33	240	36	3
2)		9.03	.75					34	4
1)	1040	12.95	.75	152	272	33	237	34	3
2)		13.150	.75					34	4
1)	1045	16.74	.75	152	257	33	237	34	5
2)		17.68	.75					34	4
1)	1050	20.52	.75	147	240	34	236	34	3
2)		21.81	.75					35	4
1)	1055	25.03	.75	152	272	34	236	34	3
2)		25.73	.75					35	4
1)	1100	30.12	.75	150	243	34	235	34	3
2)		29.62	.75					35	4
1)	1105	35.16	.75	153	268	34	235	34	3
2)		33.95	.75					35	4
1)	1110	40.11	.75	152	239	34	236	34	3
2)		38.34	.75					35	4
1)	1115	43.76	.75	152	267	34	235	34	3
2)		42.89	.75					35	4
1)	1120	47.77	.75	145	237	34	235	34	3
2)		47.27	.75					35	4
1)	1125	52.628	.75	146	265	34	236	34	3
2)		51.969	.75					35	4
1)									
2)									
1)									
2)									

Comments:

SDS 25: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name PCS		Date 2/11/16		Page 1 of 1	
Project Number		Condition Normal		Initial Leak Rate	1) 0 @ 8 "Hg
Location (Source) Coal Mill		Run 2			2) 0 @ 8 "Hg
Meter ID & Cal Factors 802547/802511		Operator LB		Final Leak Rate	1) @ "Hg
Sorbent Trap IDs	1) OC30683	Bar. Press. (in. H_2O) 29.98			2) @ "Hg
	2) OC32115	Elevation (relative to Barometer) (ft) 150		Third Bed Spike Level	1) 2,000 Ng
					2) 0 Ng

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F)				Vacuum (in. Hg)
					Sorbent	Chiller	Heat-Traced Line	Meter	
1)	1200	0	0.75	156	267	34		34	-6
2)		0	0.75					35	-6
1)	1205	6.73	0.75	151	258	34		35	-3
2)		6.83	0.75					35	-3
1)	1210	10.87	0.75	145	269	34		34	-3
2)		11.23	0.75					34	-3
1)	1215	14.38	0.75	153	257	34		35	-3
2)		14.89	0.75					35	-3
1)	1220	17.92	0.75	153	256	34		35	-3
2)		18.88	0.75					35	-3
1)	1225	22.60	0.75	145	271	35		34	-3
2)		23.55	0.75					34	-3
1)	1230	25.85	0.75	152	283	35		35	-3
2)		27.20	0.75					35	-3
1)	1235	29.82	0.75	154	280	35		35	-3
2)		30.89	0.75					36	-3
1)	1240	33.52	0.75	150	274	35		35	-3
2)		34.00	0.75					35	-3
1)	1245	36.83	0.75	158	268	35		36	-3
2)		37.65	0.75					36	-3
1)	1250	40.21	0.75	143	272	35		35	-3
2)		40.85	0.75					36	-3
1)	1255	44.05	0.75	150	271	36		36	-3
2)		44.36	0.75					36	-3
1)	1300	48.298	0.75	153	249	38		36	-3
2)		48.007	0.55					36	-3
1)									
2)									
1)									
2)									

Comments:

EPS 3F: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name: PCS	Date: 2-11-16	Page: of	
Project Number: 60402248.10	Condition: Normal	Initial Leak Rate	1) 0.000 @ 20 "Hg
Location (Source): Caking #1	Run: #3		2) 0.000 @ 19 "Hg
Meter ID & Cal Factors: 3802597/3802511	Operator: DM	Final Leak Rate	1) 0.000 @ 6 "Hg
Sorbent Trap IDs: 1) OL304582	Bar. Press. (in. H_2O)		2) 0.000 @ 6 "Hg
2) OL321152	Elevation (relative to Barometer) (ft): 100	Third Bed Spike Level	1) 2000 ng ppb
	Stack (°F)		2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1335	0.000	.75	154	259	33	241	40	3
2)		0.000	.75					40	4
1)	1340	4.28	.75	157	244	33	242	39	3
2)		4.59	.75					41	4
1)	1345	8.31	.75	151	269	33	243	39	2
2)		8.55	.75					40	4
1)	1350	12.76	0.75	144	243	33	254	39	3
2)		13.54	0.75					40	3
1)	1355	16.85	0.75	151	269	33	244	40	3
2)		17.51	0.75					40	3
1)	1400	20.75	0.75	153	251	33	243	37	3
2)		22.56	0.75					38	3
1)	1405	24.78	0.75	162	265	33	242	37	3
2)		26.42	0.75					38	3
1)	1410	28.95	0.75	150	260	33	243	36	3
2)		30.85	0.75					37	3
1)	1415	33.18	0.75	146	241	33	243	36	3
2)		36.36	0.75					37	3
1)	1420	37.64	0.75	152	269	33	245	38	3
2)		40.68	0.75					39	3
1)	1425	42.25	0.75	153	243	33	245	38	3
2)		44.97	0.75					39	3
1)	1430	46.80	0.75	151	270	33	242	37	3
2)		49.35	0.75					38	3
1)	1435	51.313							
2)		53.612							
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 2-10-16	Operator(s): RLM, WL
Location: Calciner #1	Condition: Normal	Run #: 1	Duration (min): 72
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.0	P_{bar} ("Hg): 29.7	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg C12")	ft^3/min: 0.0	Vac. ("Hg):	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum C9")	ft^3/min: 0.0	Vac. ("Hg):	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓		- P ("H_2O): ✓		Nozzle D1 (") Ø: 0.264
Probe & Pitot ID: S-1					Nozzle D2 (") ⊘: 0.273
					Nozzle D3 (") ⊖: 0.269
					Average Nozzle D ("): .269

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	1110	0	973.308	.66	1.98	143	NA	NA	NA	37	36	3
2	1113	3	975.47	.68	2.04	147				41	37	3
3	1116	6	977.72	.6	1.8	150				43	37	3
4	1119	9	979.76	.59	1.77	145				45	37	3
5	1122	12	981.81	.53	1.59	145				46	37	3
6	1125	15	983.79	.48	1.44	150				48	39	3
7	1128	18	985.65	.48	1.44	142				48	39	3
8	1131	21	987.51	.47	1.41	149				49	40	5
9	1134	24	989.38	.39	1.17	143				49	41	5
10	1137	27	991.11	.40	1.2	147				49	41	5
11	1140	30	992.78	.40	1.2	148				50	42	5
12	1143	33	994.49	.41	1.23	147				50	42	5
	1145	36	996.193									
B1	1150	36	996.193	.48	1.44	149				49	43	5
3 2	1153	39	998.15	.49	1.47	138				48	43	5
6 3	1156	42	0.040	.49	1.47	147				49	43	6
9 4	1159	45	1.94	.42	1.26	149				50	43	6
12 5	1202	48	3.73	.36	1.08	146				53	45	6
15 6	1205	51	5.44	.30	0.9	149				54	45	6
18 7	1208	54	6.99	.35	1.05	147				55	46	6
21 8	1211	57	8.71	.43	1.29	142				54	46	6
24 9	1214	60	10.41	.42	1.26	147				54	46	6
27 10	1217	63	12.20	.45	1.35	148				53	46	6
30 11	1220	66	14.00	.42	1.26	142				53	46	6
33 12	1223	69	15.85	.44	1.32	151				53	47	6
36	1226	72	17.719									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-2-16
Location: Cal #2 1 FC	Condition: Normal	Run #: 2 1 FC

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	635.4	898.0	
2	DI H_2O	100	GS	724.8	825.9	
3	Empty	--	MOD	656.1	665.9	
4	Silica Gel	--	MOD	881.1	893.9	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 6048224810	Date: 2-10-16	Operator(s): RCM/WL
Location: Calcine #1	Condition: NORMAL	Run #: 2	Duration (min): 72
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.0	P_{bar} ("Hg): 29.2	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg) 0.005	ft^3/min: 0.005	Vac. ("Hg): ~~12~~ 15	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0.008	Vac. ("Hg): 15	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): 0.0	-P ("H_2O): 0.0	Nozzle D1 (") Ø: 0.264	
Probe & Pitot ID: S-1			Nozzle D2 (") ⊘: 0.273	
			Nozzle D3 (") ⊖: 0.269	
			Average Nozzle D ("): 0.269	

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A 1	1305	0	018.589	.57	1.71	150			60	54	57	3
2	1308	3	20.68	.46	1.38	150			59	55	62	3
3	1311	6	22.57	.42	1.26	142			52	55	64	3
4	1314	9	24.35	.35	1.05	149			54	55	64	3
5	1317	12	26.04	.27	.81	144			55	56	67	3
6	1320	15	27.84	.31	1.08	150			56	56	64	3
7	1323	18	29.71	.42	1.26	149			55	65	57	3
8	1326	21	31.01	.42	1.26	152			53	65	57	3
9	1329	24	32.79	.45	1.35	152			54	66	57	5
10	1332	27	34.68	.40	1.20	149			55	66	59	6
11	1335	30	36.47	.42	1.26	153			57	65	58	6
12	1338	33	38.30	.47	1.26	147			54	65	59	6
	1341	36	40.081									
B 1	1344	39	40.081	.51	1.53	149			55	65	59	6
2	1347	42	42.01	.51	1.53	151			61	65	61	6
3	1350	45	44.10	.47	1.41	151			65	629	62	6
4	1353	45	46.56	.44	1.32	152			65	69	62	6
5	1354	48	48.55	.42	1.26	146			68	69	62	7
6	1357	51	50.26	.39	1.17	152			65	69	63	7
7	1400	54	52.04	.45	1.35	156			65	68	64	7
8	1403	57	53.88	.45	1.35	157			68	68	64	7
9	1406	60	55.72	.44	1.32	149			60	68	64	7
10	1409	63	57.59	.42	1.26	153			58	68	63	10
11	1412	66	59.48	.39	1.17	147			58	64	62	10
12	1415	69	61.21	.45	1.35	151			56	62	61	10
	1418	72	63.054									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.16	Date: 2-4-16
Location: Cal #8 1	Condition: Normal	Run #: 3-2

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	742.9	794.6	
2	DI H_2O	100	GS	662.6	767.4	
3	Empty	--	MOD	642.4	655.4	
4	Silica Gel	--	MOD	891.0	906.0	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.16	Date: 2-10-2016	Operator(s): RLM/WLH
Location: Calciner #1	Condition: NORMAL	Run #: 3	Duration (min): 72
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.0	P_{bar} ("Hg): 29.7	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.0	Vac. ("Hg): 10"	Source Height (ft): 100	Duct Diameter ("): 75
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0.000	Vac. ("Hg): 10	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: 0.264	
Probe & Pitot ID: S-1			Nozzle D2 (") ⊘: 0.273	
			Nozzle D3 (") ⊖: 0.269	
			Average Nozzle D ("): 0.269	

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
	1440											
B 1	1440	0	063.305	0.7	2.1	148			49	50	52	3
2	43	3	065.61	0.68	2.04	150			48	63	59	3
3	46	6	067.92	0.65	1.95	150			48	56	59	3
4	49	9	070.11	0.57	1.71	148			44	66	60	3
5	52	12	072.23	0.57	1.71	149			44	67	60	3
6	55	15	074.40	0.52	1.56	148			44	65	59	4
7	58	18	076.38	0.45	1.35	149			45	65	60	4
8	01	21	078.24	0.50	1.5	148			45	62	60	4
9	04	24	080.22	0.45	1.35	147			46	63	59	4
10	07	27	082.10	0.48	1.44	144			46	63	58	4
11	10	30	084.97	0.42	1.26	150			47	63	58	4
12	13	33	085.81	0.42	1.26	152			47	62	57	4
	1516	36	087.661	0.46	1.38							
A 1	1520	36	087.661	0.55	1.65	147			48	63	58	5
2	23	39	089.65	0.52	1.56	150			49	63	58	5
3	27	42	091.68	0.45	1.35	143			47	62	58	5
4	30	45	093.53	0.39	1.17	149			47	62	58	5
5	33	48	095.26	0.32	0.96	147			47	62	58	5
6	36	51	096.92	0.35	1.05	145			46	62	59	5
7	39	54	098.59	0.45	1.35	144			45	58	56	5
8	42	57	100.14	0.46	1.38	149			45	58	55	6
9	45	60	102.35	0.48	1.44	150			44	56	54	6
10	48	63	104.27	0.42	1.26	150			45	56	54	6
11	51	66	106.10	0.44	1.32	150			45	55	55	6
12	54	69	107.97	0.44	1.32	148			46	56	55	6
	1557	72	109,844									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-10-16
Location: Cal #1	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	625.0	898.5	
2	DI H_2O	100	GS	749.8	847.3	
3	Empty	--	MOD	657.2	663.8	
4	Silica Gel	--	MOD	890.4	901.0	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

A-2 Calciner No. 2

PCS Phosphate Operations - Stack Test Results

Green indicates hard entry

Test Information

Location	Calciner No. 2
Product	Single Float Calcined Rock
Source	WESP
Stack ID No	202
Start Date	2/1/2016
Pollutant	Particulate
Method	5/202

Production Data

Date	2/1/2016	2/2/2016	2/2/2016
Feed Rate, Wet, TPH (During Test)	70.1	70.1	69.7
Bulk Moisture of Rock (Lab Analyses)	12.30%	12.30%	12.30%
Rock Feed Rate Dry, TPH	61.5	61.5	61.1
Lbs. Coal/Ton of Dry Feed	40.22	40.22	40.22
Coal Feed, TPH	1.24	1.24	1.23
Process Weight Rate, TPH	62.7	62.7	62.4
Loss On Ignition	3.36%	3.36%	3.36%
Production Rate During Test, TPH Product	59.4	59.4	59.1

Test Parameters/Conditions

	Run 2	Run 3	Run 4	Average
Time of Start	16:25	10:30	13:37	N/A
Time of Finish	17:39	11:48	14:52	N/A

Stack Gas Flow Rate Calculations

Stack Flow Rate, DSCFM	39,457	39,318	39,973	39,583
Sample Volume (DSCF)	34.142	40.476	40.338	38.319

Condensable

Particulate Determination, Inorganic Fraction

	Run 2	Run 3	Run 4	Average
Net Sample Weight, mg	6.45	2.00	7.28	N/A

Condensable

Particulate Determination, Organic Fraction

Net Sample Weight, mg	3.87	2.20	1.94	N/A
Train Blank, mg	2.60			N/A
CPM, mg/DSCF	0.2437	0.0544	0.1790	0.1590

Particulate Determination, Filterable

Beaker Final Weight, mg	1.06	3.07	2.29	N/A
Final Filter Weight, mg	4.40	42.15	4.55	N/A
Net Sample Weight, mg	5.46	45.22	6.84	N/A
Mg Particulate/DSCF	0.1599	1.1172	0.1696	0.4822
Mg Particulate/DSCF, Averaged for Wash Cycle Procedures				0.2124
grams/DSCM	0.0056	0.0395	0.0060	0.0170

Total Particulate Determination

PM Emission Rate, Lbs./Hr - Filterable	0.83	5.81	0.90	2.51
PM Emission Rate, Lbs./Hr - Condensable-Inorganic	0.99	0.26	0.95	0.73
PM Emission Rate, Lbs./Hr - Condensable-Organic	0.59	0.28	0.25	0.38
PM Emission Rate, Lbs./Hr -Total Condensable (corrected with train blank)	1.27	0.28	0.95	0.83
PM Emission Rate, Lbs./Hr - Total Particulate	2.11	6.09	1.84	3.35
Average Daily PM Emission Rate, Lbs./Hr - Filterable				1.113
Average Daily PM Emission Rate, Lbs./Hr -Condensible				1.068
Average Daily PM Emission Rate, Lbs./Hr - Total Particulate				2.181
PM Emission Rate, Lbs./Day				52.337
PM Emission Rate, grams/dscm				0.0075
PM Emission Rate, grains/dscf				0.003
Allowable PM Rate, grain/dscf				0.080

Data For Avg Daily Emission Rate Calculation (inputs in red cells only)

Total PM lbs/hr

Total PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	6.09
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Total PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.97

Filterable PM lbs/hr

Filterable PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	5.81
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	0.87

Condensible PM lbs/hr

Condensible PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	0.28
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Condensible PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.11

PM Emission rate g/dscm

Filterable PM g/dscm Run with wash (enter cell address) ($E_{s)}$	0.04
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM g/dscm Avg of two non-wash runs (enter cell addresses)(E_N)	0.01

PM Emission rate mg/dscf

Filterable PM mg/dscf Run with wash (enter cell address) ($E_{s)}$	1.12
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM mg/dscf Avg of two non-wash runs (enter cell addresses)(E_N)	0.16

***Water Wash Performed on Run 3**

(R=24hrs)

$E_{avg} = E_s S\,(A+B)/AR) + E_N\,(((R-S)/R)-(BS/AR))$

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 2**
Condition	**Normal**
Sample Type:	**Method 5/202**

Run Number:	1	2	3	4	
Date:	1-Feb-16	1-Feb-16	2-Feb-16	2-Feb-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	29.83	29.82	30.17	30.12	30.04
Absolute Stack Pressure (in H2O)	29.81	29.80	30.15	30.10	30.02
Stack Static Pressure (in H2O)	-0.24	-0.24	-0.24	-0.24	-0.24
Average Stack Temperature (°F	146.5	145.0	146.1	146.8	146.0
Stack Area (sq in)	4072	4072	4072	4072	4072
Actual Meter Volume (cu ft)	36.983	36.468	40.619	40.630	39.239
Average Meter Pressure (in H2O)	0.83	0.81	1.04	1.11	0.99
Average Meter Temperature (°F	88.2	90.9	64.0	65.1	73.3
Moisture Collected (g)	301.1	275.9	356.5	366.0	332.8
Carbon Dioxide Concentration (%V)	6.2	6.2	6.2	6.2	6.2
Oxygen Concentration (%V)	14.8	14.8	14.8	14.8	14.8
Nitrogen Concentration (%V)	79.0	79.0	79.0	79.0	79.0
Dry Gas Meter Factor (γ_δ)	0.9782	0.9782	0.9782	0.9782	0.9782
Nozzle Diameter (in)	0.262	0.262	0.280	0.280	0.274
Pitot Constant	0.84	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.483	0.474	0.562	0.560	0.532
Standard Metered Volume (dscf)	34.808	34.142	40.476	40.338	38.318
Standard Metered Volume (dscm)	0.986	0.967	1.146	1.142	1.085
Stack Moisture (%V)	29.0	27.6	29.3	30.0	29.0
Saturated Moisture (%V)	23.0	22.4	22.7	22.8	22.6
Mole Fraction Dry Stack Gas	0.770	0.776	0.773	0.772	0.8
Dry Molecular Weight	29.58	29.58	29.58	29.58	29.6
Wet Molecular Weight	26.92	26.99	26.95	26.95	27.0
Average SQRT of Delta P	0.56	0.56	0.55	0.56	0.6
Stack Gas Velocity (fps)	35.1	34.6	34.3	34.9	34.6
Stack Gas Velocity (mps)	10.7	10.5	10.5	10.6	10.5
Volumetric Flow Rate (acfm)	59578	58670	58204	59267	58713.7
Volumetric Flow Rate (acmm)	1687	1662	1648	1678	1662.8
Volumetric Flow Rate (dscfm)	39805	39566	39484	40072	39707.4
Volumetric Flow Rate (dscmm)	1127	1120	1118	1135	1125
Percent Isokinetic	91.5	90.6	94.2	92.5	92.4
Post Test Meter QA (γ_{qa})	0.9963	1.0024	0.9908	1.0203	1.0045

Note: Run 1 failed the final leak check and there was not used in the overall average.

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 2
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9782
Minutes per Point	3.0
Barometric Pressure	29.93

Date	2/1/2016
Operator	DM/RLM
Run Number	1
K Factor	2.62
Meter $\gamma H_@$	1.8050
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.262
Nozzle ID 2 (in)	0.265
Nozzle ID 3 (in)	0.260
Nozzle ID (in)	0.262

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	486.4	[illegible]	291.5
Impinger 2	654.2	653.7	-0.5
Impinger 3	601.6	601.4	-0.2
Impinger 4	885.2	895.5	10.3
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			301.1
Pitot Tube ID			8-4
Saturated Percent Moisture		22.98	Standard
Calculated Percent Moisture		28.97	Volume (dscf)
Isokinetic %		91.5	34.8

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.2	14.8	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (□P) (in H2O)	Orifice Pressure Diff (□H) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	13:20:00	638.167	0.36	0.94	144	84	85
A2	3	13:23:00	639.100	0.37	0.97	145	88	87
A3	6	13:26:00	640.600	0.36	0.94	147	87	88
A4	9	13:29:00	642.400	0.32	0.84	147	86	88
A5	12	13:32:00	643.700	0.32	0.84	148	86	88
A6	15	13:35:00	645.400	0.30	0.79	141	85	89
A7	18	13:38:00	647.100	0.30	0.79	149	85	89
A8	21	13:41:00	648.7[illegible]	0.30	0.79	150	85	89
A9	24	13:44:00	6[illegible]	0.26	0.68	147	85	89
A10	27	13:47:00	6[illegible]	0.29	0.76	150	85	90
A11	30	13:50:00	6[illegible]	0.30	0.79	142	85	90
A12	33	13:53:00	65[illegible].400	0.25	0.66	147	86	90
STOP	36	13:56:00	655.600					
B1	36	14:02:00	655.600	0.35	0.92	141	89	91
B2	39	14:05:00	658.300	0.32	0.84	146	90	91
B3	42	14:08:00	659.800	0.32	0.84	145	87	90
B4	45	14:11:00	661.400	0.33	0.86	150	87	91
B5	48	14:14:00	662.900	0.35	0.92	149	87	91
B6	51	14:17:00	664.500	0.32	0.84	147	88	91
B7	54	14:20:00	666.300	0.32	0.84	149	88	92
B8	57	14:23:00	667.400	0.32	0.84	148	87	91
B9	60	14:26:00	669.400	0.34	0.89	148	87	91
B10	63	14:29:00	670.700	0.33	0.87	147	87	91
B11	66	14:32:00	672.300	0.36	0.79	146	87	92
B12	69	14:35:00	673.700	0.23	0.60	142	88	92
	72	14:38:00	675.150					

For Informational Purposes Only

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 2
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9782
Minutes per Point	3.0
Barometric Pressure	29.92

Date	2/1/2016
Operator	DM/RLM
Run Number	2
K Factor	3.40
Meter $\gamma H_@$	1.8050
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.262
Nozzle ID 2 (in)	0.260
Nozzle ID 3 (in)	0.264
Nozzle ID (in)	0.262

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	484.5	715.0	230.5
Impinger 2	546.7	568.0	21.3
Impinger 3	696.3	708.2	11.9
Impinger 4	911.8	924.0	12.2
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			275.9
Pitot Tube ID			8-4
Saturated Percent Moisture		22.42	Standard
Calculated Percent Moisture		27.59	Volume (dscf)
Isokinetic %		90.6	34.1

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.2	14.8	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (γP) (in H2O)	Orifice Pressure Diff (γH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	16:25:00	683.282	0.28	0.73	145	94	95
B2	3	16:28:00	684.800	0.31	0.81	139	93	94
B3	6	16:31:00	686.100	0.30	0.76	146	90	92
B4	9	16:34:00	687.600	0.33	0.86	146	90	92
B5	12	16:37:00	689.000	0.28	0.73	146	90	92
B6	15	16:40:00	690.500	0.27	0.71	148	90	93
B7	18	16:43:00	692.100	0.31	0.81	148	90	93
B8	21	16:46:00	693.200	0.35	0.92	145	89	93
B9	24	16:49:00	695.100	0.34	0.89	138	89	92
B10	27	16:52:00	696.900	0.32	0.84	146	88	92
B11	30	16:55:00	697.800	0.29	0.76	147	89	93
B12	33	16:58:00	699.700	0.25	0.66	143	89	93
STOP	36	17:01:00	701.015					
A1	36	17:03:00	701.015	0.34	0.89	146	90	92
A2	39	17:06:00	702.400	0.37	0.97	148	90	93
A3	42	17:09:00	703.900	0.37	0.97	141	90	93
A4	45	17:12:00	705.900	0.32	0.84	146	90	93
A5	48	17:15:00	706.900	0.36	0.94	140	89	92
A6	51	17:18:00	708.800	0.32	0.84	142	89	92
A7	54	17:21:00	710.200	0.30	0.79	147	89	92
A8	57	17:24:00	712.000	0.29	0.76	148	88	92
A9	60	17:27:00	713.700	0.29	0.76	147	88	91
A10	63	17:30:00	714.800	0.29	0.76	144	88	91
A11	66	17:33:00	716.100	0.27	0.71	147	88	91
A12	69	17:36:00	717.400	0.27	0.71	148	88	91
	72	17:39:00	719.750					

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 2
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9782
Minutes per Point	3.0
Barometric Pressure	30.27

Date	2/2/2016
Operator	DM/RLM
Run Number	3
K Factor	3.40
Meter $\Delta H_@$	1.8050
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.276
Nozzle ID 2 (in)	0.285
Nozzle ID 3 (in)	0.279
Nozzle ID (in)	0.280

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.2	14.8	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	501.8	844.4	342.6
Impinger 2	592.6	593.4	0.8
Impinger 3	688.1	691.6	3.5
Impinger 4	892.5	902.1	9.6
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			356.5
Pitot Tube ID			8-4
Saturated Percent Moisture		22.72	Standard
Calculated Percent Moisture		29.34	Volume (dscf)
Isokinetic %		94.2	40.5

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	10:30:00	721.100	0.36	1.20	147	60	62
A2	3	10:33:00	723.100	0.34	1.20	142	60	62
A3	6	10:36:00	724.900	0.35	1.20	148	60	63
A4	9	10:39:00	726.600	0.33	1.10	144	59	64
A5	12	10:42:00	728.300	0.32	1.10	149	59	64
A6	15	10:45:00	730.600	0.30	1.00	144	60	65
A7	18	10:48:00	731.800	0.28	0.95	149	60	65
A8	21	10:51:00	733.300	0.29	0.99	149	61	66
A9	24	10:54:00	735.000	0.27	0.92	149	61	66
A10	27	10:57:00	736.600	0.29	0.98	143	62	66
A11	30	11:00:00	738.200	0.27	0.92	148	62	67
A12	33	11:03:00	739.800	0.22	0.75	148	62	67
STOP	36	11:06:00	741.231					
B1	36	11:12:00	741.275	0.32	1.10	148	64	68
B2	39	11:15:00	743.200	0.30	1.00	146	65	69
B3	42	11:18:00	744.900	0.33	1.10	148	64	68
B4	45	11:21:00	746.600	0.31	1.10	145	65	68
B5	48	11:24:00	748.200	0.30	1.00	143	64	67
B6	51	11:27:00	750.000	0.28	0.95	148	64	67
B7	54	11:30:00	751.600	0.28	0.95	148	64	66
B8	57	11:33:00	753.200	0.31	1.10	142	64	66
B9	60	11:36:00	754.900	0.34	1.20	145	63	66
B10	63	11:39:00	756.700	0.40	1.30	148	63	66
B11	66	11:42:00	758.300	0.30	1.00	148	63	66
B12	69	11:45:00	760.100	0.28	0.96	138	63	65
	72	11:48:00	761.763					

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 2
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9782
Minutes per Point	3.0
Barometric Pressure	30.22

Date	2/2/2016
Operator	DM/RLM
Run Number	4
K Factor	3.48
Meter $\gamma H_@$	1.8050
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.276
Nozzle ID 2 (in)	0.285
Nozzle ID 3 (in)	0.279
Nozzle ID (in)	0.280

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.2	14.8	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	487.2	795.2	308.0
Impinger 2	654.3	684.2	29.9
Impinger 3	601.4	612.4	11.0
Impinger 4	895.4	912.5	17.1
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			366.0
Pitot Tube ID			8-4
Saturated Percent Moisture		22.76	Standard
Calculated Percent Moisture		29.96	Volume (dscf)
Isokinetic %		92.5	40.3

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (γP) (in H2O)	Orifice Pressure Diff (γH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	13:37:00	769.884	0.32	1.10	144	65	66
A2	3	13:40:00	771.600	0.37	1.30	148	65	66
A3	6	13:43:00	773.200	0.32	1.10	141	64	66
A4	9	13:46:00	774.900	0.28	0.97	148	63	66
A5	12	13:49:00	776.600	0.30	1.00	148	64	67
A6	15	13:52:00	778.200	0.29	1.00	139	63	67
A7	18	13:55:00	780.000	0.30	1.00	147	63	67
A8	21	13:58:00	781.500	0.30	1.00	148	63	67
A9	24	14:01:00	783.200	0.32	1.10	149	64	67
A10	27	14:04:00	784.900	0.32	1.10	149	63	67
A11	30	14:07:00	786.600	0.31	1.10	143	64	68
A12	33	14:10:00	788.300	0.25	0.87	148	64	66
STOP	36	14:16:00	789.755	.				
B1	36	14:16:00	789.796	0.36	1.30	149	65	68
B2	39	14:19:00	791.500	0.40	1.40	144	65	67
B3	42	14:22:00	793.400	0.40	1.40	150	64	67
B4	45	14:25:00	795.200	0.36	1.30	147	64	67
B5	48	14:28:00	796.900	0.36	1.30	150	64	67
B6	51	14:31:00	798.800	0.32	1.10	147	64	67
B7	54	14:34:00	800.600	0.31	1.10	150	63	66
B8	57	14:37:00	802.300	0.28	0.97	148	63	66
B9	60	14:40:00	803.900	0.29	1.00	150	63	66
B10	63	14:43:00	805.600	0.31	1.10	144	63	66
B11	66	14:46:00	807.300	0.28	0.97	150	63	65
B12	69	14:49:00	808.900	0.27	0.94	143	63	65
	72	14:52:00	810.555					

AECOM

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 2**
Condition	**Normal**
Sample Type:	**Method 13B**

Run Number: / Date:	1 3-Feb-16	2 12-Feb-16	3 12-Feb-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	29.94	30.16	29.99	30.03
Absolute Stack Pressure (in H2O)	29.92	30.14	29.97	30.01
Stack Static Pressure (in H2O)	-0.26	-0.26	-0.26	-0.26
Average Stack Temperature (°F)	145.5	140.7	142.0	142.7
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	39.755	37.979	37.596	38.443
Average Meter Pressure (in H2O)	0.98	0.98	0.97	0.98
Average Meter Temperature (°F)	83.1	26.8	37.4	49.1
Moisture Collected (g)	289.3	318.6	319.5	309.1
Carbon Dioxide Concentration (%V)	6.2	6.2	6.2	6.2
Oxygen Concentration (%V)	14.8	14.8	14.8	14.8
Nitrogen Concentration (%V)	79.0	79.0	79.0	79.0
Dry Gas Meter Factor (γ)	0.9782	0.9782	0.9782	0.9782
Nozzle Diameter (in)	0.280	0.280	0.280	0.280
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.527	0.565	0.545	0.546
Standard Metered Volume (dscf)	37.923	40.714	39.222	39.286
Standard Metered Volume (dscm)	1.074	1.153	1.111	1.112
Stack Moisture (%V)	26.5	27.0	27.7	27.1
Saturated Moisture (%V)	22.3	19.5	20.7	20.8
Mole Fraction Dry Stack Gas	0.777	0.805	0.793	0.792
Dry Molecular Weight	29.59	29.59	29.59	29.59
Wet Molecular Weight	27.00	27.33	27.20	27.18
Average SQRT of Delta P	0.54	0.53	0.53	0.53
Stack Gas Velocity (fps)	33.4	32.7	32.9	33.0
Stack Gas Velocity (mps)	10.2	10.0	10.0	10.1
Volumetric Flow Rate (acfm)	56714	55470	55875	56019
Volumetric Flow Rate (acmm)	1606	1571	1582	1586
Volumetric Flow Rate (dscfm)	38416	39531	38948	38965
Volumetric Flow Rate (dscmm)	1088	1120	1103	1103
Percent Isokinetic	90.7	94.6	92.5	92.6
Post Test Meter QA (γ_{qa})	1.0032	0.9863	1.0057	0.9984

Fluoride Emission Rate Calculations

				Average
Orion 901 Meter Reading, ppm	0.27	0.23	0.31	N/A
Liquid Sample Volume, ml	1000	1000	1000	N/A
Sample Aliquot	10	10	10	N/A
Sample Dilution	10	10	10	N/A
Total Fluoride, mg	0.2670	0.2340	0.3100	0.2703
Fluoride Concentration, mg/DSCF	0.0070	0.0057	0.0079	0.0069
Fluoride Emissions, lbs F/hr	0.0358	0.0301	0.0407	0.0355
Rock Feed (Wet TPH)	69.87	65.80	65.80	67.2
Fluoride Emissions, lbs F/Ton Rock Feed	0.0005	0.0005	0.0006	0.0005

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 2
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9782
Minutes per Point	3.0
Barometric Pressure	30.04

Date	2/3/2016	
Operator	WL/LB	
Run Number	1	
K Factor	3.40	
Meter $\Delta H_@$	1.8050	
Pitot Constant	0.84	
Height of Location (ft)	100	
Static Pressure (Ps)	-0.26	
Stack Geometry (R or C)?	c	
Stack Diameter (in)	72.0	
Stack Width (If Rectangle)		
Nozzle ID 1 (in)	0.280	
Nozzle ID 2 (in)	0.280	
Nozzle ID 3 (in)	0.280	
Nozzle ID (in)	0.280	

O2/CO2 Method from Hg Test

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.2	14.8	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	743.3	995.5	252.2
Impinger 2	689.3	715.3	26.0
Impinger 3	640.4	643.3	2.9
Impinger 4	914.2	922.4	8.2
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			289.3
Pitot Tube ID			6-4
Saturated Percent Moisture		22.33	Standard
Calculated Percent Moisture		26.45	Volume (dscf)
Isokinetic %		90.7	37.9

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	14:10:00	810.711	0.26	0.88	143	87	86
A2	3	14:13:00	812.430	0.33	1.12	148	86	86
A3	6	14:16:00	814.160	0.32	1.08	144	86	86
A4	9	14:19:00	815.820	0.27	0.91	147	85	85
A5	12	14:22:00	817.460	0.26	0.88	142	84	85
A6	15	14:25:00	819.010	0.30	1.02	144	84	85
A7	18	14:28:00	820.670	0.27	0.91	146	84	84
A8	21	14:31:00	822.270	0.32	1.08	147	83	84
A9	24	14:34:00	824.020	0.28	0.95	145	82	84
A10	27	14:37:00	825.640	0.28	0.95	147	82	84
A11	30	14:40:00	827.270	0.26	0.88	146	82	84
A12	33	14:43:00	828.850	0.26	0.88	144	82	84
STOP	36	14:46:00	830.415					
B1	36	14:50:00	830.415	0.32	1.08	144	82	84
B2	39	14:53:00	832.080	0.30	1.02	147	82	84
B3	42	14:56:00	833.780	0.37	1.25	146	81	84
B4	45	14:59:00	835.640	0.35	1.19	146	81	83
B5	48	15:02:00	837.470	0.31	1.05	138	80	83
B6	51	15:05:00	839.180	0.29	0.98	146	80	83
B7	54	15:08:00	840.820	0.29	0.98	148	80	83
B8	57	15:11:00	842.510	0.26	0.88	147	80	83
B9	60	15:14:00	844.070	0.26	0.88	149	80	83
B10	63	15:17:00	845.670	0.28	0.95	145	80	83
B11	66	15:20:00	847.280	0.27	0.91	146	80	83
B12	69	15:23:00	848.920	0.25	0.85	146	80	83
	72	15:26:00	850.466					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 2
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9782
Minutes per Point	3.0
Barometric Pressure	30.26

Date	2/12/2016
Operator	RLM/LB
Run Number	2
K Factor	3.40
Meter $\Delta H_@$	1.8050
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.26
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.280
Nozzle ID 2 (in)	0.280
Nozzle ID 3 (in)	0.280
Nozzle ID (in)	0.280

O2/CO2 Method from Hg Test

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.2	14.8	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	731.6	873.1	141.5
Impinger 2	758.6	916.2	157.6
Impinger 3	665.9	677.7	11.8
Impinger 4	850.3	858.0	7.7
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			318.6
Pitot Tube ID			6-4
Saturated Percent Moisture		19.52	Standard
Calculated Percent Moisture		26.95	Volume (dscf)
Isokinetic %		94.6	40.7

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	10:10:00	851.653	0.31	1.05	142	21	25
A2	3	10:13:00	853.510	0.31	1.05	127	23	26
A3	6	10:16:00	855.300	0.27	0.92	143	23	26
A4	9	10:19:00	856.920	0.29	0.99	144	23	26
A5	12	10:22:00	858.480	0.27	1.05	141	24	26
A6	15	10:25:00	860.100	0.28	0.95	143	25	26
A7	18	10:28:00	861.600	0.28	0.95	135	25	26
A8	21	10:31:00	863.110	0.26	0.88	144	26	29
A9	24	10:34:00	864.480	0.26	0.88	143	26	29
A10	27	10:37:00	866.990	0.26	0.85	146	27	30
A11	30	10:40:00	867.490	0.27	0.91	142	27	30
A12	33	10:43:00	869.120	0.27	0.91	143	27	30
STOP	36	10:46:00	870.664					
B1	36	10:49:00	870.664	0.35	1.20	141	25	25
B2	39	10:52:00	872.357	0.35	1.20	142	25	25
B3	42	10:55:00	874.050	0.40	1.36	142	25	26
B4	45	10:58:00	875.880	0.38	1.29	143	25	27
B5	48	11:01:00	877.670	0.32	1.09	137	27	30
B6	51	11:04:00	879.340	0.34	1.15	142	27	30
B7	54	11:07:00	881.010	0.26	0.88	141	28	30
B8	57	11:10:00	882.540	0.24	0.82	143	28	30
B9	60	11:13:00	884.410	0.22	0.75	138	28	29
B10	63	11:16:00	885.410	0.24	0.82	138	28	29
B11	66	11:19:00	886.410	0.22	0.75	138	28	29
B12	69	11:22:00	888.280	0.22	0.75	139	28	29
	72	11:25:00	889.632					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 2
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	0.9782
Minutes per Point	3.0
Barometric Pressure	30.09

Date	2/12/2016
Operator	RLM/WL
Run Number	3
K Factor	3.40
Meter $\Delta H_@$	1.8050
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.26
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.280
Nozzle ID 2 (in)	0.280
Nozzle ID 3 (in)	0.280
Nozzle ID (in)	0.280

O2/CO2 Method from Hg Test

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.2	14.8	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	778.8	1016.0	237.2
Impinger 2	689.3	763.9	74.6
Impinger 3	641.6	642.5	0.9
Impinger 4	905.9	912.7	6.8
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			319.5
Pitot Tube ID			6-4
Saturated Percent Moisture		20.66	Standard
Calculated Percent Moisture		27.75	Volume (dscf)
Isokinetic %		92.5	39.2

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	13:20:00	890.205	0.31	1.05	138	39	39
B2	3	13:23:00	891.720	0.31	1.05	144	39	38
B3	6	13:26:00	893.180	0.26	0.88	145	37	38
B4	9	13:29:00	894.710	0.28	0.95	146	36	38
B5	12	13:32:00	896.300	0.29	0.85	136	37	38
B6	15	13:35:00	897.800	0.25	0.85	143	36	39
B7	18	13:38:00	899.280	0.26	0.88	146	37	36
B8	21	13:41:00	901.130	0.29	0.99	141	36	39
B9	24	13:44:00	902.730	0.27	0.92	144	36	39
B10	27	13:47:00	904.300	0.27	0.92	148	36	39
B11	30	13:50:00	905.840	0.26	0.88	142	37	40
B12	33	13:53:00	907.390	0.24	0.82	144	38	40
STOP	36	13:56:00	908.852					
A1	36	14:05:00	908.852	0.38	1.29	140	38	38
A2	39	14:08:00	910.870	0.29	0.99	141	37	38
A3	42	14:11:00	911.416	0.34	1.15	141	37	38
A4	45	14:14:00	913.348	0.40	1.36	140	37	39
A5	48	14:17:00	915.280	0.40	1.36	138	38	38
A6	51	14:20:00	917.100	0.30	1.02	136	37	37
A7	54	14:23:00	918.730	0.27	0.92	140	35	38
A8	57	14:26:00	920.310	0.24	0.82	138	37	38
A9	60	14:29:00	921.800	0.25	0.85	147	35	38
A10	63	14:32:00	923.300	0.25	0.85	138	35	37
A11	66	14:35:00	924.790	0.23	0.78	146	35	37
A12	69	14:38:00	926.260	0.24	0.82	146	35	37
	72	14:41:00	927.801					

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EPA Method 30B Emission Results

PCS Phosphate
Calciner #2
Mercury
Emission Calculations

O_2 Correction Basis: 3

Pollutant: Mercury

Run	Total Hg Catch ng	Sample Volume dscm	Hg Concentration mg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration mg/dscm @ 3%	Flow Rate dscfm
1	2908	0.055	0.0526	0.0063	13.99	0.136	37,788
2	2852	0.052	0.0553	0.0066	13.99	0.143	38,103
3	2748	0.052	0.0527	0.0063	13.99	0.137	37,178
AVERAGE	**2836**	**0.053**	**0.0535**	**0.0064**	**13.99**	**0.139**	**37,690**

Method 2 Velocity Traverse

Run Number	1	Date	2/13/2016
Client/Plant	PCS	Operator	FC/CS
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #2	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.26	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.24	Corrected Baro. Pressure	30.14
		Abs. Stack Press. (in. Hg)	30.12

Assumed	CO2 Percent	O2 Percent	
Replicate 1	7.18	13.99	
Replicate 2			
Replicate 3			N2 Percent
Average	7.2	14.0	78.8

Moisture By: Saturation

Saturated Percent Moisture	22.18
Calculated Percent Moisture	22.18
Mole Frac of Dry Stack Gas	0.778
Average MW of Dry Gas	29.71
Average MW of Wet Gas	27.11

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.26	143	0.510	31.5
2	0.24	148	0.490	30.4
3	0.25	144	0.500	30.9
4	0.25	147	0.500	31.0
5	0.26	142	0.510	31.4
6	0.28	144	0.529	32.7
7	0.31	146	0.557	34.4
8	0.34	147	0.583	36.1
9	0.34	145	0.583	36.0
10	0.23	147	0.480	29.7
11	0.23	146	0.480	29.7
12	0.24	144	0.490	30.3
B1	0.25	144	0.500	30.9
2	0.31	147	0.557	34.5
3	0.34	146	0.583	36.1
4	0.33	146	0.574	35.5
5	0.28	138	0.529	32.5
6	0.31	146	0.557	34.4
7	0.30	148	0.548	33.9
8	0.29	147	0.539	33.3
9	0.29	149	0.539	33.4
10	0.28	145	0.529	32.7
11	0.26	146	0.510	31.5
12	0.23	146	0.480	29.7
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		145.46	0.53	32.60

Act Volumetric Flow Rate (acfm)	55311
Std. Volumetric Flow Rate (scfm)	48559
Dry Volumetric Flow Rate (dscfm)	37788

Note: temperatures taken from 13A testing on 2/12/16 due to faulty thermocouple

Method 2 Velocity Traverse

Run Number	2
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #2
Condition	Normal
Static Pressure (Ps)	-0.26
Location Height (ft)	100
Barometric Pressure	30.22

Date	2/13/2016
Operator	FC/CS
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	30.12
Abs. Stack Press. (in. Hg)	30.10

Assumed	CO2 Percent	O2 Percent	
Replicate 1	7.18	13.99	
Replicate 2			
Replicate 3			N2 Percent
Average	7.2	14.0	78.8

Moisture By: Saturation

Saturated Percent Moisture	20.05
Calculated Percent Moisture	20.05
Mole Frac of Dry Stack Gas	0.800
Average MW of Dry Gas	29.71
Average MW of Wet Gas	27.36

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.24	142	0.490	30.1
2	0.24	137	0.490	30.0
3	0.25	143	0.500	30.7
4	0.26	144	0.510	31.4
5	0.26	141	0.510	31.3
6	0.27	143	0.520	31.9
7	0.30	138	0.548	33.5
8	0.31	144	0.557	34.2
9	0.33	143	0.574	35.3
10	0.25	146	0.500	30.8
11	0.25	142	0.500	30.7
12	0.24	143	0.490	30.1
B1	0.24	141	0.490	30.1
2	0.28	142	0.529	32.5
3	0.31	142	0.557	34.2
4	0.28	143	0.529	32.5
5	0.28	137	0.529	32.4
6	0.30	142	0.548	33.6
7	0.26	141	0.510	31.3
8	0.28	143	0.529	32.5
9	0.27	138	0.520	31.8
10	0.27	138	0.520	31.8
11	0.26	138	0.510	31.2
12	0.23	139	0.480	29.4
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		141.25	0.52	31.80

Act Volumetric Flow Rate (acfm)	53944
Std. Volumetric Flow Rate (scfm)	47659
Dry Volumetric Flow Rate (dscfm)	38103

Note: temperatures taken from 13A testing on 2/12/16 due to faulty thermocouple

Method 2 Velocity Traverse

Run Number	3	Date	2/13/2016
Client/Plant	PCS	Operator	FC/CS
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #2	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.26	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.16	Corrected Baro. Pressure	30.06
		Abs. Stack Press. (in. Hg)	30.04

Assumed	CO2 Percent	O2 Percent	
Replicate 1	7.18	13.99	
Replicate 2			
Replicate 3			N2 Percent
Average	7.2	14.0	78.8

Moisture By: Saturation

Saturated Percent Moisture	20.61
Calculated Percent Moisture	20.61
Mole Frac of Dry Stack Gas	0.794
Average MW of Dry Gas	29.71
Average MW of Wet Gas	27.29

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.22	138	0.469	28.8
2	0.24	144	0.490	30.2
3	0.25	145	0.500	30.8
4	0.27	146	0.520	32.1
5	0.26	136	0.510	31.2
6	0.25	143	0.500	30.8
7	0.27	146	0.520	32.1
8	0.30	141	0.548	33.7
9	0.31	144	0.557	34.3
10	0.30	148	0.548	33.9
11	0.25	142	0.500	30.8
12	0.26	144	0.510	31.4
B1	0.27	140	0.520	31.9
2	0.28	141	0.529	32.5
3	0.27	141	0.520	31.9
4	0.28	140	0.529	32.5
5	0.25	138	0.500	30.7
6	0.26	136	0.510	31.2
7	0.24	140	0.490	30.1
8	0.24	138	0.490	30.0
9	0.23	147	0.480	29.6
10	0.25	138	0.500	30.7
11	0.26	146	0.510	31.5
12	0.23	146	0.480	29.6
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		142.00	0.51	31.35

Act Volumetric Flow Rate (acfm)	53179
Std. Volumetric Flow Rate (scfm)	46830
Dry Volumetric Flow Rate (dscfm)	37178

Note: temperatures taken from 13A testing on 2/12/16 due to faulty thermocouple

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METHOD 30B

Run No. 1

Date	2/13/2016		Sorbent Trap Number	OL304526	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	FC/CS		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	22	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	30.14	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	10:55:00	0.000		0.75	150	296	33	33	242	1
	5	11:00	4.34		0.75	150	298	33	33	242	1
	10	11:05	8.74		0.75	150	285	34	33	244	1
	15	11:10	12.88		0.75	152	260	34	33	246	1
	20	11:15	17.06		0.75	158	238	34	33	246	1
	25	11:20	21.21		0.75	156	229	34	33	243	1
	30	11:25	25.61		0.75	157	246	35	33	243	1
	35	11:30	29.06		0.75	159	290	36	33	242	1
	40	11:35	33.66		0.75	159	279	35	33	244	1
	45	11:40	37.20		0.75	162	261	35	33	242	1
	50	11:45	41.63		0.75	149	233	35	33	240	1
	55	11:50	45.87		0.75	142	225	35	33	236	1
	60	11:55	50.004		0.75						1
TOTAL			50.004	50.0040	0.75	154	262	34	33	243	1
Target Volume											
Spike Amount (ng)	2000										

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**54761.9542**	**54.7619542**

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AECOM

METHOD 30B

Date	2/13/2016		Sorbent Trap Number	OL232758	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0280	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0280	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	9	Barometric Pres. (" Hg)	30.14	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	10:55:00	0.000		0.75	150	296	33	33	242	2
	5	11:00	4.33		0.75	150	298	33	33	242	2
	10	11:05	8.70		0.75	150	285	34	33	244	2
	15	11:10	12.91		0.75	152	260	34	33	246	2
	20	11:15	17.12		0.75	158	238	34	33	246	2
	25	11:20	21.33		0.75	156	229	34	33	243	2
	30	11:25	25.78		0.75	157	246	35	33	243	2
	35	11:30	29.19		0.75	159	290	36	33	242	2
	40	11:35	33.71		0.75	159	279	36	33	244	2
	45	11:40	37.51		0.75	162	261	36	33	242	2
	50	11:45	41.94		0.75	149	233	36	33	240	2
	55	11:50	46.21		0.75	142	225	36	33	236	2
	60	11:55	50.610		0.75						2
TOTAL			50.610	50.610	0.75	154	262	35	33	243	2.00
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**55932.33745**	**55.9323374**

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AECOM

METHOD 30B

Run No. 2

Date	2/13/2016		Sorbent Trap Number	OL304530	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	13	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	9	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:40:00	0.000		0.75	162	268	36	33	241	2
	5	12:45	4.76		0.75	154	252	36	33	241	2
	10	12:50	9.03		0.75	157	237	37	33	239	1
	15	12:55	13.16		0.75	152	239	36	33	235	1
	20	13:00	16.88		0.75	164	276	37	33	234	1
	25	13:05	20.52		0.75	155	298	37	33	236	1
	30	13:10	24.42		0.75	163	289	38	33	236	1
	35	13:15	27.92		0.75	163	278	37	33	236	1
	40	13:20	31.89		0.75	160	248	37	33	235	1
	45	13:25	35.92		0.75	158	237	37	33	232	1
	50	13:30	39.87		0.75	162	255	37	33	232	1
	55	13:35	43.64		0.75	154	284	37	33	235	1
	60	13:40	47.226		0.75	160	290	37	33	237	1
TOTAL			47.2260	47.2260	0.75	159	265	37	33	236	1.15
Target Volume											
Spike Amount (ng)	2000										

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**51432.40413**	**51.4324041**

AECOM

METHOD 30B

Date	2/13/2016		Sorbent Trap Number	OL321064	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0280	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0280	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	13	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	8	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
A1	0	12:40:00	0.000		0.75	162	268	37	33	241	3
	5	12:45	4.660		0.75	154	252	38	33	241	3
	10	12:50	9.020		0.75	157	237	38	33	239	2
	15	12:55	13.260		0.75	152	239	38	33	235	2
	20	13:00	17.080		0.75	164	276	38	33	234	2
	25	13:05	20.850		0.75	155	298	38	33	236	2
	30	13:10	24.770		0.75	163	289	39	33	236	2
	35	13:15	28.220		0.75	163	278	38	33	236	2
	40	13:20	32.090		0.75	160	248	39	33	235	2
	45	13:25	36.070		0.75	158	237	38	33	232	2
	50	13:30	39.820		0.75	162	255	38	33	232	2
	55	13:35	43.610		0.75	154	284	38	33	235	2
	60	13:40	47.1810		0.75	160	290	38	33	237	2
TOTAL			47.1810	47.1810	0.75	159	265	38	33	236	2.15
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**51759.84167**	**51.7598417**

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AECOM

METHOD 30B

Run No. 3

Date	2/13/2016		Sorbent Trap Number	OL304748	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	14	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	6	Barometric Pres. (" Hg)	30.06	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:30:00	0.000		0.75	161	261	39	33	243	1
	5	14:35	4.570		0.75	160	295	40	33	247	1
	10	14:40	8.490		0.75	160	293	40	33	250	1
	15	14:45	12.510		0.75	159	269	40	33	253	1
	20	14:50	16.770		0.75	161	255	39	33	257	1
	25	14:55	20.380		0.75	161	241	38	33	248	1
	30	15:00	24.030		0.75	162	253	38	33	247	1
	35	15:05	28.160		0.75	160	269	38	33	242	1
	40	15:10	33.920		0.75	159	271	38	33	242	1
	45	15:15	34.580		0.75	161	264	38	33	241	1
	50	15:20	38.820		0.75	160	242	38	33	242	1
	55	15:25	43.490		0.75	160	230	38	33	239	1
	60	15:30	47.6680								
TOTAL			47.6680	47.6680	0.75	160	262	39	33	246	1.00
Target Volume											
Spike Amount (ng)	2000										

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**51621.08654**	**51.6210865**

AECOM

METHOD 30B

Date	2/13/2016		Sorbent Trap Number	OL321028	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.028	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	1.028	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	15	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	30.06	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:30:00	0.000		0.75	161	261	40	33	243	2
	5	14:35	4.500		0.75	160	295	42	33	247	2
	10	14:40	8.480		0.75	160	293	41	33	250	2
	15	14:45	12.590		0.75	159	269	41	33	253	2
	20	14:50	16.970		0.75	161	255	40	33	257	2
	25	14:55	20.700		0.75	161	241	39	33	248	2
	30	15:00	24.090		0.75	162	253	39	33	247	2
	35	15:05	28.870		0.75	160	269	39	33	242	2
	40	15:10	34.070		0.75	159	271	39	33	242	2
	45	15:15	36.120		0.75	161	264	39	33	241	2
	50	15:20	40.090		0.75	160	242	39	33	242	2
	55	15:25	44.270		0.75	160	230	39	33	239	2
	60	15:30	48.3130								
TOTAL			48.3130	48.3130	0.75	160	262	40	33	246	2.00
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for elevation

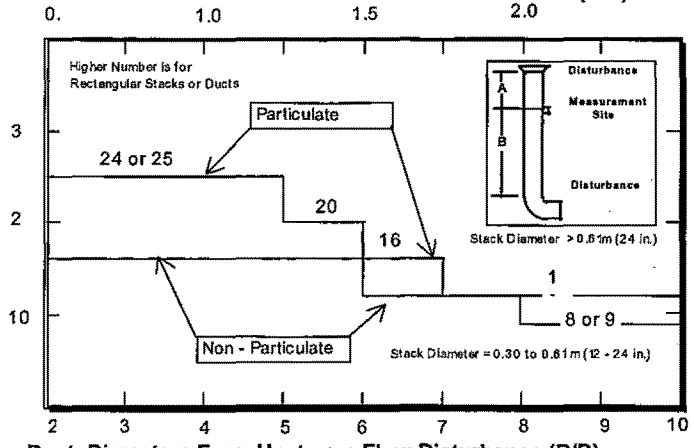
	Mechanical	Totalizer
Total Volume (L)	**52718.91529**	**52.7189153**

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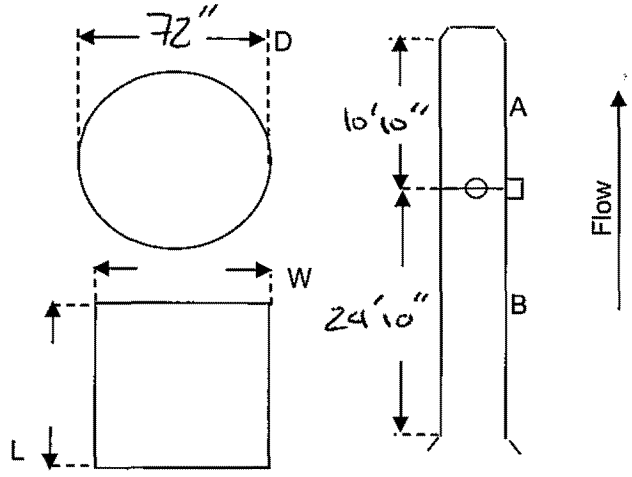
AECOM	FIELD SAMPLING DATA SHEET Sample and Velocity Traverse for Stationary Sources	EPA Method 1

Client / Plant: PCS	Project #: 60402249.10	Location: Calciner #2	Date: 2-1-16
Number of Traverse Points Chosen: 24	Number of Ports: 2	Number of Points per Port: 12	

Duct Diameters From Downstream Flow Disturbance (A/D)



Duct Diameters From Upstream Flow Disturbance (B/D)



Deq = 2LW / (L+W) _____
Dnstream Diameters (A/D) _____
Upstream Diameters (B/D) _____

Cross-Sectional Layout of Rectangular Stacks

Traverse Points	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5

Traverse Point	Fraction of Diameter	Distance From Wall	Nipple Length	Point Location
1	2.1	1.5	5"	6.5
2	6.7	4.8		9.8
3	11.8	8.5		13.5
4	17.7	12.7		17.7
5	25.0	18.0		23.0
6	35.6	25.6		30.6
7	64.4	46.4		51.4
8	75.0	54.0		59.0
9	82.3	59.3		64.3
10	88.2	63.5		68.5
11	93.3	67.2		72.2
12	97.9	70.5		75.2

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINT IN RECTANGULAR STACKS.

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

AECOM

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 2-1-16	Operator(s): DM/RM
Location: Calciner #2	Condition: Normal	Moisture Run #: Flows only	Duration (min):
DGM#: N-46	CF (Yd): 0.9978	$\Delta H_@$: 1.637	Cp: 0.84
P_{bar} ("Hg): 29.88 actual	Height w.r.t. Barometer (ft):	P_{static} ("H_2O):	-.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100	Duct Diameter ("): 72"
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Pitot Tube ID#:	
O_2 (%/time)	% (:)	% (:)	% (:)	
CO_2 (%/time)	% (:)	% (:)	% (:)	

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #:		Flow Run #:		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		10 :52	:	:	:	:	:	
						ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					A 1	.29	145					0
					2	.32	148					5
					3	.31	149					5
					4	.28	149					0
					5	.30	150					10
					6	.32	149					0
					7	.32	145					1
					8	.28	147					3
					9	.30	147					4
					10	.33	147					2
					11	.33	144					5
					12	.26	142					2
					B 1	.33	141					8
					2	.36	144					11
					3	.33	146					15
					4	.32	147					13
					5	.31	147					22
					6	.30	147					14
					7	.27	147					9
					8	.29	144					9
					9	.27	141					6
					10	.25	140					2
					11	.25	137					1
					12	.22	131					0

Comments:

Prelim Flows and Cyclone Check

Test Run 2 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-13-2016 15:28:54	-0.119	-0.207
02-13-2016 15:29:55	-0.138	-0.216
02-13-2016 15:30:55	-0.144	-0.219
Pause		
End Pause		
02-13-2016 15:33:54	19.354*	20.666*
02-13-2016 15:34:54	19.355*	20.667*
02-13-2016 15:35:54	19.358*	20.663*
Pause		
End Pause		
02-13-2016 15:37:54	10.075	9.935
02-13-2016 15:38:54	10.060	9.938
02-13-2016 15:39:54	10.057	9.939
02-13-2016 15:40:54	10.052	9.937
Pause		
End Pause		
~~02-13-2016 15:45:55~~	~~10.049~~	~~7.980~~ - Dcm analyzer "changing"
02-13-2016 15:46:54	10.048	7.217
02-13-2016 15:47:54	10.046	7.207
02-13-2016 15:48:54	10.050	7.209
Pause		
End Pause		
~~02-13-2016 15:51:55~~	~~14.364~~	~~9.920~~ - Dcm analyzer "changing"
02-13-2016 15:52:55	13.988	9.918
02-13-2016 15:53:55	13.982	9.926
02-13-2016 15:54:55	13.980	9.927
Pause		
End Pause		
02-13-2016 15:57:54	10.048	7.020
02-13-2016 15:58:55	10.052	7.166
02-13-2016 15:59:54	10.052	7.157
Pause		
End Pause		
02-13-2016 16:02:55	14.056	9.880
02-13-2016 16:03:55	13.988	9.892
02-13-2016 16:04:55	13.990	9.898
02-13-2016 16:05:55	13.986	9.908
Pause		
End Pause		
02-13-2016 16:08:55	10.056	6.197
02-13-2016 16:09:54	10.053	7.224
02-13-2016 16:10:55	10.054	7.213
Pause		
End Pause		
Pause		
End Pause		
02-13-2016 16:13:55	16.213	9.876
02-13-2016 16:14:54	14.009	9.894
02-13-2016 16:15:54	14.002	9.906
02-13-2016 16:16:54	13.995	9.930
Run Averages	O2 %	CO2 %
02-13-2016 16:16:59	11.284*	9.034*
Operator:	David Marzec	
Plant Name:	PCS Aurora	
Location:	Calciner #2	
Test Run 2 End		

External Pump
PAG 1
Run 2 - Dcm

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AECOM

EPA Method 30B Emission Results

PCS Phosphate
Calciner #2
Mercury
Emission Calculations

O_2 Correction Basis: 3%

Pollutant: Mercury

Run	Total Hg Catch ng	Sample Volume dscm	Hg Concentration mg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration mg/dscm @ 3%	Flow Rate dscfm
1	2464	0.048	0.0514	0.0062	14.8	0.151	37,838
2	2428	0.048	0.0508	0.0061	14.8	0.149	37,523
3	2110	0.048	0.0448	0.0054	14.8	0.131	37,474
AVERAGE	**2334**	**0.048**	**0.0490**	**0.0059**	**14.8**	**0.144**	**37,612**

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AECOM

METHOD 30B

Run No. 1

Date	1/30/2016		Sorbent Trap Number	OL304557	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	22	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	30.14	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	11:00:00	0.000		0.75	150	226	44	32	254	1
	5	11:05	4.06		0.75	150	227	44	32	254	1
	10	11:10	8.51		0.75	143	230	43	32	253	1
	15	11:15	11.80		0.75	146	274	43	32	253	1
	20	11:20	15.28		0.75	153	298	43	32	255	1
	25	11:25	18.62		0.75	151	282	43	32	256	1
	30	11:30	22.42		0.75	148	259	43	32	256	1
	35	11:35	26.40		0.75	146	232	43	32	255	1
	40	11:40	29.95		0.75	152	227	44	32	253	1
	45	11:45	33.47		0.75	155	257	44	32	252	1
	50	11:50	36.68		0.75	146	298	45	32	252	1
	55	11:55	40.86		0.75	148	294	44	32	255	1
	60	12:00	44.613		0.75	155	278	44	32	256	1
TOTAL			44.613	44.6130	0.75	149	262	44	32	254	1
Target Volume											
Spike Amount (ng)	2000										

Comments:
Barometric Pressure corrected for Elevation

	Mechanical	Totalizer
Total Volume (L)	**47964.99849**	**47.9649985**

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METHOD 30B

Date	1/30/2016		Sorbent Trap Number	OL321167	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0280	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0280	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	24	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	30.14	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	11:00:00	0.000		0.75	150	[illegible]	45	32	254	1
	5	11:05	3.81		0.75	150	227	45	32	254	1
	10	11:10	7.93		0.75	143	23[illegible]	44	32	253	1
	15	11:15	11.89		0.75	146	274	44	32	253	1
	20	11:20	15.86		0.75	153	298	44	32	255	1
	25	11:25	19.60		0.75	15[illegible]	282	44	32	256	1
	30	11:30	23.44		0.75	148	259	44	32	256	1
	35	11:35	27.01		0.75	146	232	45	32	255	1
	40	11:40	30.31		0.75	152	227	45	32	253	1
	45	11:45	33.77		0.75	155	257	45	32	252	1
	50	11:50	37.20		0.75	146	298	44	32	252	1
	55	11:55	40.90		0.75	148	294	45	32	255	1
	60	12:00	44.179		0.[illegible]	155	278	46	32	256	1
TOTAL			44.179	44.179	0.75	149	262	45	32	254	1
Target Volume											
Spike Amount (ng)											

Comments:
Barometric Pressure corrected for Elevation

	Mechanical	Totalizer
Total Volume (L)	**47869.86051**	**47.8698605**

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METHOD 30B

Run No. 2

Date	1/30/2016		Sorbent Trap Number	OL304508	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	18	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	9	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:20:00	0.000		0.75	146	286	45	32	247	1
	5	12:25	4.26		0.75	155	304	47	32	252	1
	10	12:30	7.98		0.75	150	281	44	32	253	1
	15	12:35	11.74		0.75	149	264	45	32	255	1
	20	12:40	15.50		0.75	157	237	46	32	255	1
	25	12:45	19.39		0.75	151	228	48	32	253	1
	30	12:50	22.85		0.75	144	247	45	32	252	1
	35	12:55	25.86		0.75	140	287	46	32	254	1
	40	13:00	30.71		0.75	151	292	48	32	256	1
	45	13:05	34.15		0.75	146	272	50	32	261	1
	50	13:10	37.61		0.75	143	252	52	32	263	1
	55	13:15	41.44		0.75	146	229	54	32	263	1
	60	13:20	44.717		0.75	157	236	55	32	262	1
TOTAL			44.7170	44.7170	0.75	149	263	48	32	256	1
Target Volume											
Spike Amount (ng)	2000										

Comments:

Barometric Pressure corrected for Elevation

	Mechanical	Totalizer
Total Volume (L)	47622.74277	47.6227428

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METHOD 30B

Run No. 2

Date	1/30/2016		Sorbent Trap Number	OL321009	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0280	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0280	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	8	Barometric Pres. (" Hg)	30.12	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
A1	0	12:20:00	0.000		0.75	146	286	44	32	247	1
	5	12:25	4.440		0.75	155	304	48	32	252	1
	10	12:30	8.430		0.75	150	28	45	32	253	1
	15	12:35	12.410		0.75	149	264	45	32	255	1
	20	12:40	16.180		0.75	157	237	45	32	255	1
	25	12:45	19.590		0.75	5	228	45	32	253	1
	30	12:50	22.670		0.75	144	247	45	32	252	1
	35	12:55	24.940		0.75	140	287	46	32	254	1
	40	13:00	29.920		0.75	151	292	48	32	256	1
	45	13:05	33.170		0.75	146	272	51	32	261	1
	50	13:10	36.980		0.75	143	252	52	32	263	1
	55	13:15	41.190		0.75	146	229	54	32	263	1
	60	13:20	44.5230		0.75	157	236	56	32	262	1
TOTAL			44.5230	44.5230	0.75	149	263	48	32	256	1
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for Elevation

	Mechanical	Totalizer
Total Volume (L)	**47889.16903**	**47.889169**

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METHOD 30B

Run No. 3

Date	1/30/2016		Sorbent Trap Number	OL304746	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #2		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	14	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	6	Barometric Pres. (" Hg)	30.06	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:35:00	0.000		0.75	141	295	66	32	261	3
	5	14:40	4.410		0.75	148	301	67	32	263	3
	10	14:45	8.190		0.75	147	28[illegible]	68	32	266	3
	15	14:50	12.060		0.75	144	260	68	32	266	3
	20	14:55	15.880		0.75	151	248	68	32	267	3
	25	15:00	19.670		0.75	15[illegible]	228	69	32	265	3
	30	15:05	23.320		0.75	147	260	70	32	264	3
	35	15:10	27.080		0.75	148	293	70	32	266	3
	40	15:15	31.180		0.75	150	284	71	32	268	3
	45	15:20	34.960		0.75	148	267	72	32	269	3
	50	15:25	38.030		0.75	146	248	72	32	269	3
	55	15:30	41.920		0.75	146	229	72	32	267	3
	60	15:35	45.7190								
TOTAL			45.7190	45.7190	0.75	148	267	69	32	266	3
Target Volume											
Spike Amount (ng)	2000										

Comments:

Barometric Pressure corrected for Elevation

	Mechanical	Totalizer
Total Volume (L)	**46632.95745**	**46.6329575**

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METHOD 30B

Run No. 3

Date	1/30/2016		Sorbent Trap Number	OL321426	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.028	
Location	Cal #2 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	1.028	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	15	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	30.06	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:35:00	0.000		0.75	141	265	64	32	261	3
	5	14:40	4.080		0.75	148	301	65	32	263	3
	10	14:45	7.960		0.75	147	28	66	32	266	3
	15	14:50	11.950		0.75	144	260	66	32	266	3
	20	14:55	15.930		0.75	151	248	66	32	267	3
	25	15:00	19.740		0.75	15	228	67	32	265	3
	30	15:05	23.420		0.75	147	260	67	32	264	3
	35	15:10	27.150		0.75	148	293	68	32	266	3
	40	15:15	31.360		0.75	150	284	68	32	268	3
	45	15:20	35.110		0.75	148	267	69	32	269	3
	50	15:25	38.260		0.75	146	248	71	32	269	3
	55	15:30	42.140		0.75	146	229	71	32	267	3
	60	15:35	46.0250								
TOTAL			46.0250	46.0250	0.75	148	267	67	32	266	3
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for Elevation

	Mechanical	Totalizer
Total Volume (L)	**47593.6295**	**47.5936295**

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Method 2 Velocity Traverse

Run Number	1
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #2
Condition	Normal
Static Pressure (Ps)	-0.27
Location Height (ft)	100
Barometric Pressure	30.24

Date	1/30/2016
Operator	DM/FC
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	30.14
Abs. Stack Press. (in. Hg)	30.12

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.20	14.80	
Replicate 2			
Replicate 3			
Average	6.2	14.8	79.0

Moisture By: Saturation

Saturated Percent Moisture	23.33
Calculated Percent Moisture	23.33
Mole Frac of Dry Stack Gas	0.767
Average MW of Dry Gas	29.5
Average MW of Wet Gas	26.8

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
B1	0.32	143	0.566	35.1
2	0.36	143	0.600	37.2
3	0.34	142	0.583	36.1
4	0.31	144	0.557	34.5
5	0.27	145	0.520	32.3
6	0.27	147	0.520	32.3
7	0.28	148	0.529	32.9
8	0.29	149	0.539	33.5
9	0.26	149	0.510	31.8
10	0.25	150	0.500	31.2
11	0.23	151	0.480	29.9
12	0.20	151	0.447	27.9
A1	0.28	146	0.529	32.9
2	0.29	150	0.539	33.6
3	0.31	150	0.557	34.7
4	0.29	150	0.539	33.6
5	0.28	149	0.529	33.0
6	0.27	150	0.520	32.4
7	0.29	149	0.539	33.5
8	0.29	148	0.539	33.5
9	0.31	148	0.557	34.6
10	0.31	145	0.557	34.6
11	0.31	145	0.557	34.6
12	0.27	145	0.520	32.3
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		147.38	0.53	33.24

Act Volumetric Flow Rate (acfm)	56391
Std. Volumetric Flow Rate (scfm)	49350
Dry Volumetric Flow Rate (dscfm)	37838

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Method 2 Velocity Traverse

Run Number	2	Date	1/30/2016
Client/Plant	PCS	Operator	DM/FC
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #2	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.27	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.22	Corrected Baro. Pressure	30.12
		Abs. Stack Press. (in. Hg)	30.10

Assumed	CO2 Percent	O2 Percent	
Replicate 1	6.20	14.80	
Replicate 2			
Replicate 3			N2 Percent
Average	6.2	14.8	79.0

Moisture By: Saturation

Saturated Percent Moisture	22.76
Calculated Percent Moisture	22.76
Mole Frac of Dry Stack Gas	0.772
Average MW of Dry Gas	29.58
Average MW of Wet Gas	25.95

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
B!	0.32	142	0.566	35.0
2	0.30	141	0.548	33.9
3	0.30	145	0.548	34.0
4	0.31	146	0.566	35.1
5	0.31	148	0.557	34.6
6	0.30	148	0.548	34.1
7	0.27	150	0.520	32.4
8	0.26	148	0.510	31.7
9	0.25	150	0.500	31.1
10	0.25	151	0.500	31.2
11	0.25	152	0.500	31.2
12	0.23	151	0.480	29.9
A1	0.27	147	0.520	32.3
2	0.28	148	0.529	32.9
3	0.28	148	0.529	32.9
4	0.27	147	0.520	32.3
5	0.25	146	0.500	31.0
6	0.26	146	0.510	31.7
7	0.27	147	0.520	32.3
8	0.27	145	0.520	32.2
9	0.29	144	0.539	33.4
10	0.30	144	0.548	33.9
11	0.30	144	0.548	33.9
12	0.27	143	0.520	32.2
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		146.71	0.53	32.71
			Act Volumetric Flow Rate (acfm)	55490
			Std. Volumetric Flow Rate (scfm)	48582
			Dry Volumetric Flow Rate (dscfm)	37523

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Method 2 Velocity Traverse

Run Number	3	Date	1/30/2016
Client/Plant	PCS	Operator	DM/FC
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #2	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.27	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.16	Corrected Baro. Pressure	30.06
		Abs. Stack Press. (in. Hg)	30.04

Assumed	CO2 Percent	O2 Percent	
Replicate 1	6.20	14.80	
Replicate 2			
Replicate 3			N2 Percent
Average	6.2	14.8	79.0

Moisture By: Saturation

Saturated Percent Moisture	22.24
Calculated Percent Moisture	22.24
Mole Frac of Dry Stack Gas	0.778
Average MW of Dry Gas	29.38
Average MW of Wet Gas	27.01

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp T (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
B1	0.31	141	0.557	34.4
2	0.32	141	0.566	35.0
3	0.30	142	0.548	33.9
4	0.29	143	0.539	33.3
5	0.30	144	0.548	33.9
6	0.28	146	0.529	32.8
7	0.26	149	0.510	31.7
8	0.27	150	0.520	32.4
9	0.25	151	0.500	31.2
10	0.24	151	0.490	30.5
11	0.24	151	0.490	30.5
12	0.22	150	0.469	29.2
A1	0.27	147	0.520	32.3
2	0.28	147	0.529	32.9
3	0.27	147	0.520	32.3
4	0.25	147	0.500	31.1
5	0.26	145	0.510	31.6
6	0.26	143	0.510	31.6
7	0.28	143	0.529	32.8
8	0.27	143	0.520	32.2
9	0.30	144	0.548	33.9
10	0.29	144	0.539	33.4
11	0.30	142	0.548	33.9
12	0.27	143	0.520	32.2
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		145.58	0.52	32.45

Act Volumetric Flow Rate (acfm)	55052
Std. Volumetric Flow Rate (scfm)	48192
Dry Volumetric Flow Rate (dscfm)	37474

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FIELD SAMPLING DATA SHEET

EPA Method 13A/B

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Client/Plant: PCS	Project #: 60402248.10	Date: 02/3/16	Operator(s): WL/LB
Location: Cgl. #2	Condition: Normal	Run #: 1	Duration (min): 72
DGM#: N-54	CF (Yd): 0.9978	$\Delta H_@$: 1.637	Cp: 0.84
K-Factor: 3.40	P_{bar} ("Hg): 30.1	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -0.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 11	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 8	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓			Nozzle D1 (") Ø: .280
Probe & Pitot ID:					Nozzle D2 (") ⊘: .280
					Nozzle D3 (") ⊖: .280
					Average Nozzle D ("): .280

Sample Point	Time		DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)						Pump Vac. ("Hg)
	Clock	Run (min)				Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	
Port												
A1	1410	0	810.711	.26	.88	143			62	87	86	2
2		3	812.43	.33	1.12	148			61	86	86	2
3		6	814.16	.32	1.08	144			58	86	86	2
4		9	815.82	.27	.91	147			56	85	85	2
5		12	817.46	.26	.88	142			55	84	85	2
6		15	819.01	.30	1.02	144			54	84	85	3
7		18	820.67	.27	.91	146			54	84	85	3
8		21	822.27	.32	1.08	147			55	83	84	3
9		24	824.02	.28	.95	145			55	82	84	3
10		27	825.64	.28	.95	147			55	82	84	3
11		30	827.27	.26	.88	146			56	82	84	3
12		33	828.85	.26	.88	144			56	92	84	3
	1446	36	830.415			Port		Change				
B1	1450		830.416	.32	1.08	144			58	82	84	4
2		39	832.08	.30	1.02	147			56	82	84	4
3		42	833.78	.37	1.25	146			54	81	84	5
4		45	835.64	.35	1.19	146			55	81	83	5
5		48	837.47	.31	1.05	138			55	80	83	4
6		51	839.18	.29	.98	146			55	80	83	4
7		54	840.82	.29	.98	148			56	80	83	4
8		57	842.51	.26	.88	147			56	80	83	4
9		60	844.07	.26	.88	149			57	80	83	4
10		63	845.67	.28	.95	145			57	80	83	4
11		66	847.28	.27	.91	146			57	80	83	4
12		69	848.92	.25	.85	146			57	80	83	4
	1526	72	850.466									

NTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-2-16
Location: Cal #2	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	743.3	995.5	
2	DI H_2O	100	GS	689.3	715.3	
3	Empty	--	MOD	640.4	643.3	
4	Silica Gel	--	MOD	914.2	922.4	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

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FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE ____ / OF 1

Client/Plant: AECOM	Project #: 60402248.10	Date: 2/12/2016	Operator(s): RLM/WL
Location: CALCINER 2	Condition: NORMAL	Run #: X 2nd	Duration (min): 72
DGM#: N-501	CF (Yd): 0.990178	$\Delta H_@$: 1.637	Cp: 0.84
K-Factor: 3.4	P_{bar} ("Hg): 30.1	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -0.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.0	Vac. ("Hg): 12	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0.01	Vac. ("Hg): 10	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓			Nozzle D1 (") Ø: .280
Probe & Pitot ID:					Nozzle D2 (") ⊘: .280
					Nozzle D3 (") ⊖: .280
					Average Nozzle D ("): .280

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O) 1.054	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit s68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A 1	1010	0	851.653	.31	~~.39~~	142			20	24	25	
2	13	3	853.51	.31	0.05	127			19	23	26	
3	16	6	855.30	.27	.92	143			20	23	26	1
4	19	9	856.92	.29	.99	144			21	23	26	1
5	22	12	858.45	.27	1.05	141			22	24	26	1
6	25	15	860.10	.28	0.95	143			23	25	26	1
7	28	18	861.60	.23	0.95	138			24	25	26	2
8	31	21	863.11	.26	0.88	144			25	26	29	2
9	34	24	864.48	.26	0.85	143			26	26	29	2
10	307	27	866.99	.26	0.85	146			27	27	30	2
11	40	30	867.49	.27	~~0.88~~ .91	142			22	27	30	2
12	43	33	869.12	.27	.91	143			22	27	30	3
	1046	36	870.664								2	
B 1	1049	39	870.664	.35	1.2	141			22	25	25	4
2	52	~~42~~ 39	872.357	.35	1.2	142			23	25	25	4
3	55	~~45~~ 42	874.05	.40	1.36	142			24	25	26	4
4	58	~~48~~ 45	875.58	.35	1.29	143			22	25	27	4
5	1101	~~51~~ 48	877.62	.32	1.09	137			21	27	30	5
6	04	~~54~~ 51	879.34	.34	1.15	142			22	27	30	5
7	07	~~57~~ 54	881.01	.26	0.88	141			22	29	30	5
8	10	~~60~~ 57	882.54	.24	0.82	143			23	28	30	5
9	13	60	884.46	.22	0.75	138			20	28	29	5
10	16	63	885.41	.24	0.82	138			20	28	29	5
11	19	66	886.91	.22	0.75	138			22	28	29	5
12	22	69	888.25	.22	.75	139			22	28	29	5
	1125	72	889.682									

COMMENTS TIMER HUNG UP ON POINT 2 OF 3 - WENT TO WATCH SUBSEQUENTLY. RDR

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 7-9-16
Location: Col #1 #2 FC	Condition: Normal	Run #: 1 2 FC

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	731.6	873.1	
2	DI H_2O	100	GS	758.6	916.2	
3	Empty	--	MOD	665.9	677.7	
4	Silica Gel	--	MOD	850.3	858.0	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM — FIELD SAMPLING DATA SHEET

EPA Method 13A/B — PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 2-12-2016	Operator(s): RLM/WL
Location: CALCINER #7	Condition: NORMAL	Run #: 3	Duration (min): 72
DGM#: N-54	CF (Yd): 0.9975	$\Delta H_@$: 1.637	Cp: 0.84
K-Factor: 3.4	P_{bar} ("Hg): 30.1	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -0.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.005	Vac. ("Hg): 12"	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0.000	Vac. ("Hg): 8"	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: 0.280	
Probe & Pitot ID:			Nozzle D2 (") ⊘: 0.280	
			Nozzle D3 (") ⊖: 0.280	
			Average Nozzle D ("): 0.280	

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
1	1320	000	890.205	.31	1.054	138			43	39	39	1
2		3	891.72	.31	1.035	144			43	39	38	1
3		6	893.18	.26	.884	145			40	37	38	1
4		9	894.71	.28	.952	146			41	36	38	1
5		12	896.30	.25	.85	136			41	37	38	1
6		15	897.80	.25	.85	143			43	36	39	2
7		18	899.28	.26	.884	142			43	37	36	2
8		21	901.13	.29	.986	141			43	37	39	2
9		24	902.73	.27	.918	144			43	36	39	1
10		27	904.30	.27	.918	145			43	36	39	1
11		30	905.84	.26	.884	142			43	37	40	1
12		33	907.39	.24	.816	144			44	38	40	2
	1356	36	908.852								38	
1		36	908.852	.38	1.292	140			43	38	38	2
2		39	910.87	.29	.958	141			43	37	38	2
3	1403	42	911.416	.34	1.15	141			42	37	38	2
4		45	913.345	.40	1.36	140			41	37	39	2
5		48	915.28	.40	1.36	138			40	38	38	3
6		51	917.10	.30	1.02	136			39	37	37	4
7		54	918.73	.27	.918	140			40	35	38	4
8		57	920.31	.24	.816	138			41	37	38	3
9		60	921.80	.25	.85	147			40	35	38	4
10		63	923.30	.25	.85	138			38	35	37	4
11		66	924.79	.23	.78	146			38	35	37	3
12		69	926.26	.24	.816	146			39	35	37	3
	1441	72	927.801									

406 - TRAVEL TO DUST TRAIN 90 STEL

COMMENTS SHAKY PLATFORM IN 20 MPH WIND.

1441 OFF (RLM)

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-11-16
Location: Cal #2	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	778.8	1016.0	
2	DI H_2O	100	GS	689.3	763.9	
3	Empty	--	MOD	641.6	642.5	
4	Silica Gel	--	MOD	905.9	912.7	
			Sum			

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

Plant Name: PCS	Date: 1-30-16	Page: 1 of 1	
Project Number: 60402248.10	Condition: Normal	Initial Leak Rate	1) 0.0 @ 22 "Hg; 2) 0.0 @ 24 "Hg
Location (Source): Calciner #2	Run: #1		
Meter ID & Cal Factors: 802414 / 802663	Operator: DM/FC	Final Leak Rate	1) 0.0 @ 7 "Hg; 2) 6.0 @ 7 "Hg
Sorbent Trap IDs: 1) OL304557 (spike); 2) QL321167	Bar. Press. (in. H_2O): 30.10		
	Elevation (relative to Barometer) (ft): ~~3010~~ DM	Third Bed Spike Level	1) 2000 ng; 2) N/A
Box #1	Start (°F)		

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1100	0.00	.75	150	236	32	254	44	1
2)		0.00	.75					45	1
1)	1105	4.06	.75	150	227	32	254	44	1
2)		3.81	.75					45	1
1)	1110	8.51	.75	143	238	32	253	43	1
2)		7.93	.75					44	1
1)	1115	11.80	.75	146	274	32	253	43	1
2)		11.89	.75					44	1
1)	1120	15.28	.75	153	298	32	255	43	1
2)		15.86	.75					44	1
1)	1125	18.62	.75	150	282	32	256	43	1
2)		19.60	.75					44	1
1)	1130	22.42	.75	148	259	32	256	43	1
2)		23.44	.75					44	1
1)	1135	26.40	.75	146	232	32	255	43	1
2)		27.01	.75					45	1
1)	1140	29.95	.75	152	227	32	253	44	1
2)		30.31	.75					45	1
1)	1145	33.47	.75	155	257	32	252	44	1
2)		33.77	.75					45	1
1)	1150	36.68	.75	146	298	32	252	45	1
2)		37.20	.75					44	1
1)	1155	40.86	.75	148	294	32	255	44	1
2)		40.90	.75					45	1
1)	1200	44.613	.75	155	278	32	256	44	1
2)		44.179	.75					44	1
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name	PCS	Date	1-30-16	Page	1 of 1
Project Number	60602248.10	Condition	Normal	Initial Leak Rate	1) 0.0 @ 18 "Hg
Location (Source)	Caldwer #2	Run	#2		2) 0.0 @ 20 "Hg
Meter ID & Cal Factors	8002404 / 8002403	Operator	DM / FC	Final Leak Rate	1) 0.0 @ 9 "Hg
Sorbent Trap IDs	1) OL304508 spike	Bar. Press. (in. H_2O)	30.06		2) 0.0 @ 8 "Hg
	2) OL321009	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) 2000 ng
		Stack (°F)			2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1220	0.00	.75	146	286	32	247	45	1
2)		0.00	.75					44	1
1)	1225	4.26	.75	155	304	32	252	47	1
2)		4.44	.75					48	1
1)	1230	7.98	.75	150	286	32	253	44	1
2)		8.43	.75					45	1
1)	1235	11.74	.75	149	264	32	255	45	1
2)		12.41	.75					45	1
1)	1240	15.50	.75	157	237	32	255	46	1
2)		16.18	.75					45	1
1)	1245	19.39	.75	155	228	32	253	48	1
2)		19.59	.75					45	1
1)	1250	22.85	.75	144	247	32	252	45	1
2)		22.67	.75					45	1
1)	1255	26.86	.75	140	287	32	254	46	1
2)		24.92	.75					46	1
1)	1300	30.71	.75	157	292	32	256	48	1
2)		29.92	.75					48	1
1)	1305	34.16	.75	146	272	32	261	50	1
2)		33.17	.75					51	1
1)	1310	37.61	.75	143	252	32	263	52	1
2)		36.98	.75					52	1
1)	1315	41.44	.75	146	279	32	263	54	1
2)		41.19	.75					54	1
1)	1320	44.717	.75	157	236	32	262	55	1
2)		44.523	.75					56	1
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Meth

AECOM

Plant Name	PCS	Date	1-30-16	Page	1 of 1
Project Number	60402248.10	Condition	Normal	Initial Leak Rate	1) 0.00 @ 14 "Hg
Location (Source)	Calciner #2	Run	#3		2) 0.00 @ 15 "Hg
Meter ID & Cal Factors	802494 / 802463	Operator	DM/FC	Final Leak Rate	1) 0.000 @ 6 "Hg
Sorbent Trap IDs	1) OL3044746 spike	Bar. Press. (in. H_2O)	30.10		2) 0.000 @ 7 "Hg
	2) OL3214426	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) 2000 ng
					2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	~~STACK TEMP. ΔP (in. H_2O)~~	Temperature (°F)				Vacuum (in. Hg)
					Sorbent	Chiller	Heat-Traced Line	Meter	
1)	1435	0	0.75	141	295	32	261	66	3
2)		0	0.75					64	3
1)	1440	4.41	0.75	148	301	32	263	67	3
2)		4.08	0.75					65	3
1)	1445	8.19	0.75	147	285	32	266	68	3
2)		7.96	0.75					66	3
1)	1450	12.06	0.75	144	260	32	266	68	3
2)		11.95	0.75					66	3
1)	1455	15.88	0.75	151	248	32	267	68	3
2)		15.93	0.75					66	3
1)	1500	19.67	0.75	156	228	32	265	69	3
2)		19.74	0.75					67	3
1)	1505	23.32	0.75	147	260	32	264	70	3
2)		23.42	0.75					67	3
1)	1510	27.08	0.75	148	293	32	266	70	3
2)		27.15	0.75					68	3
1)	1515	31.18	0.75	150	284	32	268	71	3
2)		31.36	0.75					68	3
1)	1520	34.96	0.75	148	267	32	269	72	3
2)		35.11	0.75					69	3
1)	1525	38.03	0.75	146	248	32	269	72	3
2)		38.26	0.75					71	3
1)	1530	41.92	0.75	146	229	32	267	72	3
2)		42.14	0.75					71	3
1)	1535	45.719							
2)		46.025							
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE _____ OF _____

Client/Plant: PCS	Project #: 60602648.10	Date: 1-30-16	Operator(s): DM/FC
Location: Calciner #2	Condition: Normal	Moisture Run #:	Duration (min):
DGM#: N-44	CF (Yd): 1.02266	$\Delta H_@$: 1.9218	Cp: 0.84
P_{bar} ("Hg): 30.11	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24	
Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Pitot Tube ID#:
Fyrite/Orsat O_2 (%/time)	% (:)	% (:)	% (:)
Fyrite/Orsat CO_2 (%/time)	% (:)	% (:)	% (:)

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #: 2		Flow Run #: 3		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		11:51	11:56	13:16	13:19	15:13	:	
						ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					B1	.32	143	.32	142	0.31	141	
					2	.34	143	.30	141	0.32	141	
					3	.34	142	.30	145	0.30	142	
					4	.31	144	.32	146	0.29	143	
					5	.27	145	.31	148	0.30	144	
					6	.27	147	.30	148	0.28	146	
					7	.28	148	.27	150	0.26	149	
					8	.29	149	.26	148	0.27	150	
					9	.26	149	.25	150	0.25	151	
					10	.25	150	.25	151	0.24	151	
					11	.23	151	.25	152	0.24	151	
					12	.20	151	.23	151	0.22	150	
					A1	.28	146	.27	147	0.27	147	
					2	.29	150	.28	148	0.28	147	
					3	.31	150	.28	148	0.27	147	
					4	.29	150	.27	147	0.25	147	
					5	.28	149	.25	146	0.26	145	
					6	.27	150	.26	146	0.26	143	
					7	.29	149	.27	147	0.28	143	
					8	.29	148	.28	145	0.27	143	
					9	.31	148	.29	144	0.30	144	
					10	.31	145	.30	144	0.29	144	
					11	.31	145	.32	144	0.30	142	
					12	.27	145	.27	143	0.27	143	

Comments:

AECOM

Plant Name PPS	Date 2-13-16	Page 1 of 1	
Project Number 60402248.10	Condition Normal	Initial Leak Rate	1) 0.000 @ 22 "Hg
Location (Source) C&I #2	Run 1		2) 0.000 @ 20 "Hg
Meter ID & Cal Factors 5002494/5002663	Operator FC/CS	Final Leak Rate	1) 0.000 @ 7 "Hg
Sorbent Trap IDs 1) OL304526	Bar. Press. (in. H_2O) 30.10		2) 0.010 @ 9 "Hg
2) OL232758	Elevation (relative to Barometer) (ft) 100	Third Bed Spike Level	1) 2000 ng
STACK TEMP			2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1055	0.000	0.75	150	296	33	242	33	1
2)		0.000	0.75					33	2
1)	1100	4.34	0.75	150	298	33	242	33	1
2)		4.33	0.75					33	2
1)	1105	8.74	0.75	150	285	33	244	34	1
2)		8.70	0.75					34	2
1)	1110	12.88	0.75	152	260	33	246	34	1
2)		12.91	0.75					34	2
1)	1115	17.06	0.75	158	238	33	246	34	1
2)		17.12	0.75					34	2
1)	1120	21.21	0.75	156	229	33	243	34	1
2)		21.33	0.75					34	2
1)	1125	25.61	0.75	157	246	33	243	34	1
2)		25.78	0.75					35	2
1)	1130	29.06	0.75	159	290	33	242	35	1
2)		29.19	0.75					36	2
1)	1135	33.66	0.75	159	279	33	244	36	1
2)		33.71	0.75					36	2
1)	1140	37.20	0.75	162	261	33	242	35	1
2)		37.51	0.75					36	2
1)	1145	41.63	0.75	149	233	33	240	35	1
2)		41.94	0.75					36	2
1)	1150	45.87	0.75	142	225	33	236	35	1
2)		46.21	0.75					36	2
1)	1155	50.004							
2)		50.410							
1)									
2)									
1)									
2)									

Comments: Box #1

SOS-35: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name	PCS	Date	2-13-16	Page	1 of 1
Project Number	60402248.10	Condition	Normal	Initial Leak Rate	1) 0.000 @ 13 "Hg
Location (Source)	Caldron #2	Run	#2		2) 0.004 @ 13 "Hg
Meter ID & Cal Factors	8002494 / 8002463	Operator	DM	Final Leak Rate	1) 0.000 @ 9 "Hg
Sorbent Trap IDs	1) OL-304530	Bar. Press. (in. H_2O)	30.2 act. 30.1 cor		2) 0.006 @ 8 "Hg
	2) OL-321064	Elevation (relative to Barometer) (ft)	100	Third Bed Spike Level	1) 200.4 ug 3/4/16
		Stack (F°)			2)

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1240	0.000	.75	162	245	33	241	36	2
2)		0.000	.75					37	3
1)	1245	4.76	.75	154	252	33	241	36	2
2)		4.16	.75					38	3
1)	1250	9.03	.75	157	237	33	239	37	1
2)		9.02	.75					38	2
1)	1255	13.16	.75	152	239	33	235	36	1
2)		13.24	.75					38	2
1)	1300	16.88	.75	164	276	33	234	37	1
2)		17.08	.75					38	2
1)	1305	20.52	.75	165	298	33	236	37	1
2)		20.85	.75					38	2
1)	1310	24.42	.75	163	289	33	236	38	1
2)		24.77	.75					39	2
1)	1315	27.92	.75	163	278	33	236	37	1
2)		28.22	.75					38	2
1)	1320	31.89	.75	160	268	33	235	37	1
2)		32.09	.75					39	2
1)	1325	35.92	.75	158	237	33	232	37	1
2)		36.07	.75					38	2
1)	1330	39.87	.75	162	255	33	232	37	1
2)		39.82	.75					38	2
1)	1335	43.64	.75	154	284	33	235	37	1
2)		43.161	.75					38	2
1)	1340	47.226	.75	160	290	33	237	37	1
2)		47.181	.75					38	2
1)									
2)									
1)									
2)									

Comments: Box #1

SDS-35: Mercury by Sorbent Trap - Met.

AECOM

Plant Name: RCS	Date: 2-13-16	Page: 1 of 1	
Project Number: 60470246.10	Condition: Normal	Initial Leak Rate	1) 0.0 @ 14 "Hg; 2) 0.0 @ 15 "Hg
Location (Source): Calciner #2	Run: #3		
Meter ID & Cal Factors: 8002494 / 8002463	Operator: DM / FC	Final Leak Rate	1) 0.0 @ 4 "Hg; 2) 0.0 @ 7 "Hg
Sorbent Trap IDs: 1) OL34748 spike; 2) OL321028	Bar. Press. (in. H_2O): 30.1 corr.		
	Elevation (relative to Barometer) (ft): 100 Stack(-)	Third Bed Spike Level	1) 2000 ng; 2) N/A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1430	0.000	.75	161	261	33	243	39	1
2)		0.000	.75					40	2
1)	1435	4.57	.76	160	295	33	247	40	1
2)		4.50	.76					42	2
1)	1440	8.49	.75	160	293	33	250	40	1
2)		8.48	.76					41	2
1)	1445	12.61	.76	159	269	33	253	40	1
2)		12.59	.75					41	2
1)	1450	16.77	.75	161	255	33	257	39	1
2)		16.97	.75					40	2
1)	1455	20.38	.75	161	241	33	248	38	1
2)		20.70	.75					39	2
1)	1500	24.03	.76	162	253	33	247	38	1
2)		24.09	.76					39	2
1)	1505	28.16	0.75	160	269	33	242	38	1
2)		28.87	0.75					39	2
1)	1510	33.92	0.75	159	271	33	242	38	1
2)		34.07	0.75					39	2
1)	1515	34.58	0.75	161	264	33	241	38	1
2)		36.12	0.75					39	2
1)	1520	38.82	0.75	160	242	33	242	38	1
2)		40.09	0.75					39	2
1)	1525	43.49	0.75	160	230	33	239	38	1
2)		44.27	0.75					39	2
1)	1530	47.668							
2)		48.313							
1)									
2)									
1)									
2)									

Comments: Box #1

SDS-35: Mercury by Sorbent Trap - A

AECOM

Plant Name		Date		Page	of	
Project Number		Condition		Initial Leak Rate	1)	@ "Hg
Location (Source)		Run			2)	@ "Hg
Meter ID & Cal Factors		Operator		Final Leak Rate	1)	@ "Hg
Sorbent Trap IDs	1)	Bar. Press. (in. H_2O)			2)	@ "Hg
	2)	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1)	
					2)	

1 B A

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F)				Vacuum (in. Hg)
					Sorbent	Chiller	Heat-Traced Line	Meter	
1)									
2)									
1)		FLOW A	1 0.26		Flow A	1 0.24	Flow 1	0.22	
2)			2 0.24			2 0.24	A 2	0.24	
1)			3 0.25			3 0.25	3	0.25	
2)			4 0.25			4 0.26	4	0.27	
1)			5 0.26			5 0.26	5	0.26	
2)			6 0.28			6 0.27	6	0.25	
1)			7 0.31			7 0.30	7	0.27	
2)			8 0.34			8 0.31	8	0.30	
1)			9 0.34			9 0.33	9	0.31	
2)			10 0.23			10 0.25	10	0.30	
1)			11 0.1823			11 0.25	11	0.25	
2)			12 0.24			12 0.24	12	0.26	
1)							Flow 1		
2)		FLOW B	1 0.25		FLOW B	1 0.24	B 1	0.27	
1)			2 0.31			2 0.28	2	0.28	
2)			3 0.34			3 0.31	3	0.27	
1)			4 0.33			4 0.28	4	0.28	
2)			5 0.28			5 0.28	5	0.25	
1)			6 0.31			6 0.30	6	0.26	
2)			7 0.30			7 0.24	7	0.24	
1)			8 0.29			8 0.28	8	0.24	
2)			9 0.29			9 0.27	9	0.23	
1)			10 0.28			10 0.27	10	0.25	
2)			11 0.26			11 0.26	11	0.26	
1)			12 0.28			12 0.23	12	0.1823	
2)									
1)									
2)									

Comments: Start = -.26

Flows for Cal #2 Hg on 2/13 /19

SDS-35: Mercury by Sorbent Trap – Method 30B

FIELD SAMPLING DATA SHEET

AECOM

Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 02-01-16	Operator(s): DM/RCM
Location: Calciner #2	Condition: Normal	Run #: 1	Duration (min): 72
Console#: N-46	CF (Yd): 0.9978	$\Delta H_@$: 1.637	Cp: 0.84
K-Factor: 2.62	P_{bar} ("Hg): 29.80 actual	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 18	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg): 6	Duct Width ("): --	Duct Length ("): --

Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P:	-P:
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D1 (") Ø: .262
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D2 (") ⊘: .265
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D3 (") ⊖: .260
				Average Nozzle D ("): .262

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B1	1320	0	638.167	.36	.94	144	254	254	67	76	84	86	3
2		3	639.1	.37	.97	145	256	252	66	76	88	87	3
3		6	640.6	.36	.94	147	253	250	63	78	87	88	3
4		9	642.4	.32	.84	147	256	251	65	80	86	88	3
5		12	643.7	.32	.84	148	257	251	66	84	86	89	3
6		15	645.4	.30	.79	141	256	250	68	81	85	89	3
7		18	647.1	.30	.79	149	255	250	61	76	85	89	3
8		21	648.7	.30	.79	150	255	250	59	72	85	89	3
9		24	649.9	.26	.68	147	254	249	60	68	85	90	3
10		27	651.1	.29	.76	150	254	249	54	66	85	90	3
11		30	652.8	.30	.79	142	257	251	55	67	85	90	3
12		33	654.4	.25	.66	147	251	248	56	69	86	90	3
STOP	1359	36	655.6			PORT CHANGE							
A 1	1402	36	655.6	.35	.92	141	256	251	49	67	89	91	3
2		39	658.3	.32	.84	146	254	249	51	67	90	91	3
3		42	659.8	.32	.84	145	256	251	45	68	87	90	3
4		45	661.4	.33	.86	150	256	248	46	68	87	91	3
5		48	662.9	.35	.92	149	250	252	46	67	87	91	3
6		51	664.5	.32	.84	147	254	250	45	68	88	91	3
7		54	666.3	.32	.84	149	256	250	44	69	88	92	3
8		57	667.4	.32	.84	148	254	248	46	70	87	91	3
9		60	669.4	.34	.89	148	254	251	48	69	87	91	4
10		63	670.7	.33	.87	147	256	251	45	68	87	91	4
11		66	672.3	.30	.79	146	254	249	46	67	87	92	4
12		69	673.7	.23	.60	142	256	251	47	66	88	92	3
END	1434	72	675.150										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60402248.10	Date: 2-1-16
Location: Cal #2	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	486.4	777.9	
2	MT	0	MGS	654.2	653.7	
3	Water	100	MGS	601.6	601.4	
4	Silica Gel	350	MGS	885.2	895.5	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14124	Tare Wt. (g)	0.37537
	ID#:		Tare Wt. (g)	
	ID#:		Tare Wt. (g)	

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET
Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60602248.10	Date: 02-01-16	Operator(s): DW/RLM
Location: Calciner #2	Condition: Normal	Run #: 2	Duration (min): 72
Console#: N-54	CF (Yd): 0.9978	$\Delta H_@$: 1.637	Cp: 0.84
K-Factor: 2.62	P_{bar} ("Hg): 29.59	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: Ø	Vac. ("Hg): 13	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("): --	Duct Length ("): --

Pitot Leak ✓ (>3"H_2O)	Initial +P:	-P:	Final +P:	-P:
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D1 (") Ø: .262
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D2 (") ⊘: .260
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D3 (") ⊖: .264
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Average Nozzle D ("): .262

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	1625	0	683.282	.28	.73	145	244	237	67	82	94	95	3
2		3	684.8	.31	.81	139	248	242	65	80	93	94	3
3		6	686.1	.30	.76	146	253	250	61	79	90	92	3
4		9	687.6	.33	.86	146	259	253	59	78	90	92	3
5		12	689.0	.28	.73	146	257	252	54	74	90	92	3
6		15	690.5	.27	.71	148	256	251	53	75	90	93	3
7		18	692.1	.31	.81	148	254	250	54	76	90	93	3
8		21	693.2	.35	.92	145	255	251	54	77	89	93	3
9		24	695.1	.34	.89	138	255	251	54	76	89	92	3
10		27	696.9	.32	.84	146	256	250	54	77	88	92	3
11		30	697.8	.29	.76	147	254	250	56	79	89	93	3
12		33	699.7	.25	.66	143	255	250	55	78	89	93	3
Stop		36	701.015										
B1	1703	36	701.015	.34	.89	146	256	251	59	79	90	92	3
2		39	702.4	.37	.97	148	252	251	57	77	90	93	3
3		42	703.9	.37	.97	147	252	252	57	77	90	93	3
4		45	705.6	.32	.84	146	252	249	55	74	90	93	3
5		48	706.9	.36	.94	140	255	250	55	75	89	92	3
6		51	708.8	.32	.84	142	255	250	54	68	89	92	3
7		54	710.2	.30	.79	147	254	251	55	69	88	92	3
8		57	712.0	.29	.76	148	256	250	55	69	88	92	3
9		60	713.7	.29	.76	147	254	251	55	70	88	91	3
10		63	714.8	.29	.76	144	255	250	56	72	88	91	3
11		66	716.1	.27	.71	147	255	249	56	73	88	91	3
12		69	717.4	.27	.71	148	254	250	56	73	88	91	3
END		72	719.760										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant:	PCS	Project #:	60402248.10	Date:	2-1-16
Location:	Cal #2	Condition:	Normal	Run #:	2

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	484.5	715.6	
2	MT	0	MGS	846.7	568.0	
3	Water	100	MGS	696.3	708.2	
4	Silica Gel	350	MGS	911.8	924.0	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14123	Tare Wt. (g)	0.37656
	ID#:		Tare Wt. (g)	
	ID#:		Tare Wt. (g)	

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET
Particulate Matter M5/202

EPA Method 5/202

PAGE _____ OF _____

Client/Plant: PCS	Project #: 60402248.10	Date: 2-2-16	Operator(s): DM/RLM
Location: Calciner #2	Condition: Normal (w/wash)	Run #: 3	Duration (min): 72
Console#: N-54	CF (Yd): 0.9978	$\Delta H_@$: 1.637	Cp: 0.84
K-Factor: 34	P_{bar} ("Hg): 30.10	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.0	Vac. ("Hg): 13	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0.0	Vac. ("Hg): 9	Duct Width ("): --	Duct Length ("): --

Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P: ✓	-P: ✓

Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)

Nozzle D1 (") Ø:
Nozzle D2 (") ⊘:
Nozzle D3 (") ⊖:
Average Nozzle D ("): .280

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B1	1030	0	721.100	.36	1.2	147	257	249	49	69	60	62	5
2		3	723.1	.34	1.2	142	252	251	47	70	60	62	5
3		6	724.9	.35	1.2	148	255	250	47	71	60	63	5
4		9	726.6	.33	1.1	144	255	250	44	69	59	64	5
5		12	728.3	.32	1.1	149	256	251	45	69	59	64	5
6		15	730.6	.30	1.0	144	254	250	41	67	60	65	4
7		18	731.8	.28	.95	149	254	250	42	68	60	65	4
8		21	733.3	.29	.99	149	256	250	41	68	61	66	4
9		24	735.0	.27	.92	149	255	251	42	69	61	66	4
10		27	736.6	.29	.98	143	258	250	43	70	62	66	4
11		30	738.2	.27	.92	148	255	251	42	70	62	67	4
12		33	739.8	.22	.75	148	256	250	43	69	62	67	4
STOP	1106	36	741.231			PORT CHANGE							
A1	1116	36	74.275	.32	1.1	148	253	251	44	68	64	68	4
2		39	743.2	.30	1.0	146	255	249	41	69	65	69	4
3		42	744.9	.33	1.1	148	257	251	45	70	64	68	4
4		45	746.6	.31	1.1	145	258	250	46	70	65	68	4
5		48	748.2	.30	1.0	143	253	250	48	70	64	67	4
6		51	750.0	.28	.95	148	256	249	45	69	64	67	4
7		54	751.6	.28	.95	148	256	250	46	69	64	66	5
8		57	753.2	.31	1.1	142	255	251	45	70	64	66	5
9		60	754.9	.34	1.2	145	254	248	46	68	63	66	5
10		63	756.7	.40	1.3	148	254	258	41	66	63	66	5
11		66	758.3	.30	1.0	148	255	247	41	67	63	66	5
12		69	760.1	.28	.96	138	254	245	47	68	63	65	5
END	1148	72	761.763										

COMMENTS 1116 - 1146

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60402248.10	Date: 3 2-1-16
Location: Cal #2	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	501.8	844.4	
2	MT	0	MGS	592.6	593.4	
3	Water	100	MGS	688.1	691.6	
4	Silica Gel	350	MGS	892.5	902.1	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14122	Tare Wt. (g)	0.37596
	ID#:		Tare Wt. (g)	
	ID#:		Tare Wt. (g)	

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

FIELD SAMPLING DATA SHEET

AECOM

Particulate Matter M5/202

EPA Method 5/202

PAGE _____ OF _____

Client/Plant: PCS	Project #: 60402748.10	Date: 02-02-16	Operator(s): DM/ELM
Location: Calciner #2	Condition: Normal	Run #: 4	Duration (min): 72
Console#: M-54	CF (Yd): 0.9978	$\Delta H_@$: 1.637	Cp: 0.84
K-Factor: 3.48	P_{bar} ("Hg): 30.12	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.0	Vac. ("Hg): 10	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0.0	Vac. ("Hg): 7	Duct Width ("): --	Duct Length ("): --
Pitot Leak ✓ (>3"H_2O)	Initial +P:	-P:	Final +P:	-P:

Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)

Nozzle D1 (") Ø:

Nozzle D2 (") ⊘:

Nozzle D3 (") ⊖:

Average Nozzle D ("): .280

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	1336	0	769.884	~~.30~~ .32	1.0	147	250	244	42	70	65	66	4
2		3	771.6	.37	1.3	148	253	252	43	69	65	66	4
3		6	773.2	.32	1.1	141	256	251	44	69	64	66	4
4		9	774.9	.28	.97	148	258	248	43	67	63	66	4
5		12	776.4	.30	1.0	148	257	251	44	66	64	67	4
6		15	778.2	.29	1.0	139	254	249	45	67	63	67	4
7		18	780.0	.30	1.0	147	254	250	43	67	63	67	4
8		21	781.5	.30	1.0	148	255	250	42	68	63	67	4
9		24	783.2	.32	1.1	149	254	250	43	67	64	67	4
10		27	784.9	.32	1.1	149	255	251	41	66	63	67	4
11		30	786.6	.31	1.1	143	255	251	42	69	64	68	4
12		33	788.3	.25	.87	148	256	250	41	70	64	66	4
STOP		36	789.785			PORT CHANGE							
B1	1416	36	789.796	~~.36~~ .3	1.3	149	254	250	43	68	65	68	4
2		39	791.5	.4	1.4	144	255	251	40	68	65	67	4
3		42	793.4	.4	1.4	150	253	249	41	67	64	67	4
4		45	795.2	.36	1.3	147	256	251	41	69	64	67	4
5		48	796.9	.36	1.3	150	254	251	40	71	64	67	4
6		51	798.8	.32	1.1	147	255	251	40	71	64	67	4
7		54	800.6	.31	1.1	150	256	249	41	72	63	66	5
8		57	802.3	.28	.97	148	256	251	42	71	63	66	5
9		60	803.9	.29	1.0	150	254	249	43	71	63	66	5
10		63	805.6	.31	1.1	144	254	248	44	72	63	66	5
11		66	807.3	.28	.97	150	255	251	44	73	63	65	5
12		69	808.9	.27	.94	143	254	249	44	72	63	65	5
END	1452	72	810.555										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60402248.10	Date: 2-2-16
Location: Cal #2	Condition: Normal	Run #: ~~3~~ 4

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	487.2	795.2	
2	MT	0	MGS	654.3	684.2	
3	Water	100	MGS	601.4	612.4	
4	Silica Gel	350	MGS	895.4	912.5	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14109	Tare Wt. (g)	0.37221
	ID#:		Tare Wt. (g)	
	ID#:		Tare Wt. (g)	

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

A-3 Calciner No. 3

PCS Phosphate Operations - Stack Test Results

Test Information

Location	Calciner No. 3
Product	Single Float Calcined Rock
Source	WESP
Stack ID No.	203
Start Date	6/9/2015
Pollutant	Particulate
Method	5/202

Production Data

Date	6/9/2015	6/10/2015
Time Start	13:16	09:35
Time Finish	14:36	15:28
Feed Rate, Wet, TPH (During Test)	70.0	70.0
Bulk Moisture of Rock (Lab Analyses)	10.15%	10.72%
Rock Feed Rate Dry, TPH	62.9	62.5
Lbs. Coal/Ton of Dry Feed	54.62	54.62
Coal Feed, TPH	1.72	1.71
Process Weight Rate, TPH	64.6	64.2
Loss On Ignition	6.41%	6.41%
Production Rate During Test, TPH Product	58.9	58.5

Test Parameters/Conditions

	Run 1	Run 3	Run 4	Average
Time of Start	13:16	09:35	13:54	N/A
Avg Stack Temperature oF	157	159	160	159
Stack Wet Bulb Temperature oF	157	159	160	159
S.V.P.	8.981	9.424	9.652	9.352
Vapor Pressure	8.981	9.424	9.652	9.352
Barometric Pressure, in. Hg	29.80	30.01	30.30	30.04
Stack Static Pressure, in. H20	-0.25	-0.22	-0.34	-0.27
Stack Pressure, in Hg	29.78	29.99	30.28	30.02
Stack Diameter, inches	72	72	72	N/A
Stack Area, ft2	28.27	28.27	28.27	N/A
Nozzle Diameter, inches	0.2897	0.2897	0.2897	N/A
Nozzle Area, ft2	0.00046	0.00046	0.00046	N/A
Pitot Tube Coefficient	0.84	0.84	0.84	N/A
Sampling Time, minutes	72	72	72	N/A
Dry Molecular Wt Stk Gas	29.000	29.000	29.000	29.000

Stack Gas Flow Rate Calculations

Total water collected, grams	424.54	548.78	513.36	495.56
Increase of silica gel, grams	11.87	13.64	11.30	12.27
Gas Volume, DSCF	40.612	42.519	38.787	40.639
Sample Gas Volume	61.189	69.037	63.524	64.583
% Moisture, Bws by Collection	33.63%	38.41%	38.94%	36.99%
% Moisture, Bws By Vapor Pressure	30.16%	31.42%	31.88%	31.15%
Wet Molecular Wt of Stk Gas	25.68	25.54	25.49	25.57
Stack Velocity, ft/sec	33.14	32.80	32.04	32.66
Stack Flow Rate, ACFM	56,220	55,638	54,358	55,405
Stack Flow Rate, SCFM	47,859	47,563	46,863	47,428
Stack Flow Rate, DSCFM	33,427	32,619	31,922	32,656
Isokinetic Sampling Rate	104	112	104	107

Page 2
Calciner No. 3
06/09/15

Condensable
Particulate Determination, Inorganic Fraction

	Run 1	Run 3	Run 4	Average
Net Sample Weight, grams (From EnthalpyAnalytical)	0.0079	0.0059	0.0047	N/A

Condensable
Particulate Determination, Organic Fraction

Net Sample Weight, grams (From EnthalpyAnalytical)	0.0047	0.0122	0.0055	N/A
CPM, mg/DSCF	0.3122	0.4240	0.2619	N/A

Particulate Determination, Filterable

Beaker Tare Weight, grams	126.8178	176.8216	179.2970	N/A
Beaker Final Weight, grams	126.8270	176.8338	179.3159	N/A
Tare Filter Weight, grams	0.6290	0.6292	0.6390	N/A
Final Filter Weight, grams	0.6310	0.6306	0.6727	N/A
Net Sample Weight, grams	0.0112	0.0136	0.0526	N/A
Mg Particulate/DSCF	0.2758	0.3199	1.3561	0.6506
Mg Particulate/DSCF, Averaged for Wash Cycle Procedures				0.3507
grams/DSCM	0.0097	0.0113	0.0479	0.0230

Total Particulate Determination

PM Emission Rate, Lbs./Hr - Filterable	1.22	1.38	5.73	2.78
PM Emission Rate, Lbs./Hr - Condensable-Inorganic	0.86	0.59	0.51	0.66
PM Emission Rate, Lbs./Hr - Condensable-Organic	0.52	1.24	0.60	0.78
PM Emission Rate, Lbs./Hr -Total Condensable	1.38	1.83	1.11	1.44
PM Emission Rate, Lbs./Hr - Total Particulate	2.60	3.21	6.83	4.21
Average Daily PM Emission Rate, Lbs./Hr - Filterable				1.521
Average Daily PM Emission Rate, Lbs./Hr -Condensible				1.580
Average Daily PM Emission Rate, Lbs./Hr - Total Particulate				3.101
PM Emission Rate, grams/dscm				0.0124
PM Emission Rate, grains/dscf				0.005
Allowable PM Rate, grain/dscf				0.080

AECOM

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 3**
Condition	**Normal**
Sample Type:	**Method 13B**

Run Number: / Date:	1 13-Feb-16	2 13-Feb-16	3 13-Feb-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	30.16	30.18	30.17	30.17
Absolute Stack Pressure (in H2O)	30.14	30.16	30.15	30.15
Stack Static Pressure (in H2O)	-0.24	-0.24	-0.24	-0.24
Average Stack Temperature (°F	147.0	146.6	151.3	148.3
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	41.249	41.098	42.404	41.584
Average Meter Pressure (in H2O)	1.27	1.29	1.37	1.31
Average Meter Temperature (°F	35.8	37.5	40.0	37.8
Moisture Collected (g)	353.3	204.6	370.3	309.4
Carbon Dioxide Concentration (%V)	5.7	5.7	5.7	5.7
Oxygen Concentration (%V)	15.1	15.1	15.1	15.1
Nitrogen Concentration (%V)	79.2	79.2	79.2	79.2
Dry Gas Meter Factor (γ_δ)	1.0189	1.0189	1.0189	1.0189
Nozzle Diameter (in)	0.280	0.280	0.280	0.280
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.629	0.625	0.641	0.631
Standard Metered Volume (dscf)	45.257	44.973	46.156	45.462
Standard Metered Volume (dscm)	1.282	1.273	1.307	1.287
Stack Moisture (%V)	26.9	17.7	27.4	24.0
Saturated Moisture (%V)	23.3	22.7	25.7	23.9
Mole Fraction Dry Stack Gas	0.767	0.823	0.743	0.778
Dry Molecular Weight	29.52	29.52	29.52	29.52
Wet Molecular Weight	26.83	27.49	26.56	26.96
Average SQRT of Delta P	0.60	0.60	0.62	0.60
Stack Gas Velocity (fps)	37.1	36.6	38.9	37.6
Stack Gas Velocity (mps)	11.3	11.2	11.9	11.4
Volumetric Flow Rate (acfm)	63013	62135	65960	63703
Volumetric Flow Rate (acmm)	1785	1760	1868	1804
Volumetric Flow Rate (dscfm)	42348	44890	42636	43291
Volumetric Flow Rate (dscmm)	1199	1271	1207	1226
Percent Isokinetic	98.2	92.1	99.5	96.6
Post Test Meter QA (γ_{qa})	1.0219	1.0394	1.0404	1.0339

Fluoride Emission Rate Calculations

				Average
Orion 901 Meter Reading, ppm	0.25	0.13	0.22	N/A
Liquid Sample Volume, ml	1000	1000	1000	N/A
Sample Aliquot	10	10	10	N/A
Sample Dilution	10	10	10	N/A
Total Fluoride, mg	0.2480	0.1340	0.2180	0.2000
Fluoride Concentration, mg/DSCF	0.0055	0.0030	0.0047	0.0044
Fluoride Emissions, lbs F/hr	0.0307	0.0177	0.0266	0.0250
Rock Feed (Wet TPH)	67.39	67.39	67.39	67.4
Fluoride Emissions, lbs F/Ton Rock Feed	0.0005	0.0003	0.0004	0.0004

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 3
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	30.26

O2/CO2 Method from Hg Test

	CO2 Percent	O2 Percent	
Replicate 1	5.7	15.1	
Replicate 2			
Replicate 3			N2 Percent
Average	5.7	15.1	79.2

Date	2/13/2016
Operator	RLM/WL
Run Number	1
K Factor	3.00
Meter $\Delta H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	
Nozzle ID 2 (in)	
Nozzle ID 3 (in)	0.280
Nozzle ID (in)	0.280

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	732.2	1033.6	301.4
Impinger 2	771.5	813.3	41.8
Impinger 3	668.8	672.1	3.3
Impinger 4	857.8	864.6	6.8
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			353.3
Pitot Tube ID			6-4
Saturated Percent Moisture		23.31	Standard
Calculated Percent Moisture		26.90	Volume (dscf)
Isokinetic %		98.2	45.3

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Tm out (F)
A1	0	9:40:00	999.801	0.38	1.14	147	31	35
A2	3	9:43:00	1001.470	0.32	1.15	139	32	34
A3	6	9:46:00	1003.020	0.36	1.12	144	31	33
A4	9	9:49:00	1004.710	0.30	1.08	146	32	35
A5	12	9:52:00	1006.230	0.30	1.08	140	36	35
A6	15	9:55:00	1007.830	0.33	1.20	149	35	35
A7	18	9:58:00	1009.430	0.36	1.30	145	37	33
A8	21	10:01:00	1011.180	0.40	1.40	144	37	33
A9	24	10:04:00	1014.290	0.35	1.26	144	37	33
A10	27	10:07:00	1015.380	0.34	1.22	145	37	33
A11	30	10:10:00	1016.480	0.33	1.18	151	37	33
A12	33	10:13:00	1018.180	0.33	1.20	142	38	34
STOP	36	10:16:00	1019.890					
B1	36	10:19:00	1019.890	0.32	1.15	145	39	35
B2	39	10:22:00	1021.480	0.40	1.40	151	39	35
B3	42	10:25:00	1023.230	0.47	1.70	149	38	34
B4	45	10:28:00	1025.150	0.51	1.84	150	36	35
B5	48	10:31:00	1027.240	0.51	1.84	154	40	35
B6	51	10:34:00	1029.250	0.46	1.65	155	40	35
B7	54	10:37:00	1031.190	0.40	1.65	154	39	35
B8	57	10:40:00	1033.210	0.40	1.40	153	40	35
B9	60	10:43:00	1035.150	0.30	1.08	151	40	35
B10	63	10:46:00	1036.980	0.28	1.00	144	40	36
B11	66	10:49:00	1038.350	0.25	1.00	147	40	36
B12	69	10:52:00	1039.830	0.24	0.36	139	39	36
	72	10:55:00	1041.050					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 3
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	30.28

Date	2/13/2016
Operator	WL/LM
Run Number	2
K Factor	3.00
Meter $\Delta H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	
Nozzle ID 2 (in)	
Nozzle ID 3 (in)	0.280
Nozzle ID (in)	0.280

O2/CO2 Method from Hg Test

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	5.7	15.1	
Replicate 2			
Replicate 3			
Average	5.7	15.1	79.2

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	767.4	961.8	194.4
Impinger 2	692.0	697.6	5.6
Impinger 3	643.9	643.6	-0.3
Impinger 4	904.5	909.4	4.9
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			204.6
Pitot Tube ID			6-4
Saturated Percent Moisture		22.72	Standard
Calculated Percent Moisture		17.66	Volume (dscf)
Isokinetic %		92.1	45.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	12:20:00	41.751	0.37	1.33	143	35	35
A2	3	12:23:00	43.470	0.32	1.15	150	36	35
A3	6	12:26:00	45.100	0.38	1.36	141	37	35
A4	9	12:29:00	46.840	0.30	1.08	150	38	35
A5	12	12:32:00	48.330	0.33	1.18	142	39	35
A6	15	12:35:00	50.000	0.33	1.18	138	39	35
A7	18	12:38:00	51.580	0.29	1.04	144	39	35
A8	21	12:41:00	53.170	0.38	1.36	146	39	35
A9	24	12:44:00	54.980	0.31	1.11	141	39	35
A10	27	12:47:00	56.530	0.32	1.15	146	39	35
A11	30	12:50:00	58.180	0.34	1.22	150	40	36
A12	33	12:53:00	59.840	0.28	1.00	147	40	36
STOP	36	12:56:00	61.435					
B1	36	12:59:00	61.435	0.53	1.90	151	39	36
B2	39	13:02:00	63.500	0.49	1.76	153	40	36
B3	42	13:05:00	65.460	0.53	1.90	153	41	36
B4	45	13:08:00	67.530	0.53	1.90	144	41	36
B5	48	13:11:00	69.620	0.48	1.72	148	41	36
B6	51	13:14:00	71.580	0.43	1.54	152	41	36
B7	54	13:17:00	73.470	0.36	1.29	149	41	36
B8	57	13:20:00	75.230	0.34	1.22	150	40	36
B9	60	13:23:00	76.920	0.27	0.97	147	40	36
B10	63	13:26:00	78.440	0.29	1.04	144	40	36
B11	66	13:29:00	80.020	0.23	0.82	143	40	36
B12	69	13:32:00	81.450	0.23	0.82	147	40	36
	72	13:35:00	82.849					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 3
Condition	Normal
Meter Box Number	N-54
Meter Factor (γ_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	30.27

Date	2/13/2016
Operator	RLM/WL
Run Number	3
K Factor	3.00
Meter $\Delta H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	
Nozzle ID 2 (in)	
Nozzle ID 3 (in)	0.280
Nozzle ID (in)	0.280

O2/CO2 Method from Hg Test

	CO2 Percent	O2 Percent
Replicate 1	5.7	15.1
Replicate 2		
Replicate 3		
Average	5.7	15.1

N2 Percent: 79.2

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	644.7	874.1	229.4
Impinger 2	763.2	889.2	126.0
Impinger 3	656.8	663.2	6.4
Impinger 4	905.1	913.6	8.5
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			370.3
Pitot Tube ID			6-4
Saturated Percent Moisture		25.74	Standard
Calculated Percent Moisture		27.45	Volume (dscf)
Isokinetic %		99.5	46.2

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Tm out (F)
A1	0	14:31:00	83.600	0.47	1.58	153	39	38
A2	3	14:34:00	85.420	0.36	1.30	155	39	40
A3	6	14:37:00	87.100	0.32	1.20	157	38	41
A4	9	14:40:00	88.760	0.36	1.30	154	42	38
A5	12	14:43:00	90.470	0.24	0.86	155	43	38
A6	15	14:46:00	91.880	0.45	1.62	155	43	38
A7	18	14:49:00	93.700	0.37	1.33	153	42	39
A8	21	14:52:00	95.430	0.35	1.26	156	43	39
A9	24	14:55:00	97.140	0.35	1.26	151	43	39
A10	27	14:58:00	98.820	0.37	1.33	141	43	39
A11	30	15:01:00	100.570	0.42	0.95	145	43	39
A12	33	15:04:00	102.070	0.35	1.26	150	43	39
STOP	36	15:07:00	103.887					
B1	36	15:10:00	103.837	0.52	1.80	151	41	39
B2	39	15:13:00	105.770	0.40	1.44	152	42	39
B3	42	15:16:00	107.610	0.50	1.80	152	42	38
B4	45	15:19:00	109.670	0.45	1.62	150	42	39
B5	48	15:22:00	111.600	0.56	2.00	148	42	38
B6	51	15:25:00	113.700	0.54	1.94	148	42	38
B7	54	15:28:00	115.830	0.39	1.40	148	42	38
B8	57	15:31:00	117.670	0.40	1.44	144	41	38
B9	60	15:34:00	119.450	0.35	1.15	151	41	38
B10	63	15:37:00	121.130	0.25	0.90	160	41	38
B11	66	15:40:00	122.810	0.25	1.00	154	41	37
B12	69	15:43:00	124.340	0.31	1.11	149	40	37
	72	15:46:00	125.954					

AECOM

EPA Method 30B Emission Results

PCS Phosphate
Calciner #3
Mercury
Emission Calculations

O_2 Correction Basis: 3

Pollutant: Mercury

Run	Total Hg Catch ng	Sample Volume dscm	Hg Concentration mg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration mg/dscm @ 3%	Flow Rate dscfm
1	2206	0.042	0.0524	0.0063	15.08	0.161	37,692
2	2301	0.045	0.0511	0.0061	15.08	0.157	37,380
3	2551	0.051	0.0500	0.0060	15.08	0.154	37,389
AVERAGE	**2353**	**0.046**	**0.0512**	**0.0061**	**15.08**	**0.157**	**37,487**

Method 2 Velocity Traverse

Run Number	1	Date	1/30/2016
Client/Plant	PCS	Operator	DM/FC
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #3	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.27	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.05	Corrected Baro. Pressure	29.95
		Abs. Stack Press. (in. Hg)	29.93

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.73	15.08	
Replicate 2			
Replicate 3			N2 Percent
Average	5.7	15.1	79.2

Moisture By: Saturation

Saturated Percent Moisture	23.47
Calculated Percent Moisture	23.47
Mole Frac of Dry Stack Gas	0.765
Average MW of Dry Gas	29.52
Average MW of Wet Gas	26.82

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
B1	0.32	143	0.566	35.2
2	0.36	143	0.600	37.3
3	0.34	142	0.583	36.3
4	0.31	144	0.557	34.7
5	0.27	145	0.520	32.4
6	0.27	147	0.520	32.5
7	0.28	148	0.529	33.1
8	0.29	149	0.539	33.7
9	0.26	149	0.510	31.9
10	0.25	150	0.500	31.3
11	0.23	151	0.480	30.0
12	0.20	151	0.447	28.0
A1	0.28	146	0.529	33.0
2	0.29	150	0.539	33.7
3	0.31	150	0.557	34.9
4	0.29	150	0.539	33.7
5	0.28	149	0.529	33.1
6	0.27	150	0.520	32.5
7	0.29	149	0.539	33.7
8	0.29	148	0.539	33.7
9	0.31	148	0.557	34.8
10	0.31	145	0.557	34.7
11	0.31	145	0.557	34.7
12	0.27	145	0.520	32.4
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		147.38	0.53	33.39

Act Volumetric Flow Rate (acfm)	56640
Std. Volumetric Flow Rate (scfm)	49254
Dry Volumetric Flow Rate (dscfm)	37692

Method 2 Velocity Traverse

Run Number	2	Date	1/30/2016
Client/Plant	PCS	Operator	DM/FC
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #3	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.27	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.03	Corrected Baro. Pressure	29.93
		Abs. Stack Press. (in. Hg)	29.91

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.73	15.08	
Replicate 2			
Replicate 3			N2 Percent
Average	5.7	15.1	79.2

Moisture By: Saturation

Saturated Percent Moisture	22.91
Calculated Percent Moisture	22.91
Mole Frac of Dry Stack Gas	0.771
Average MW of Dry Gas	29.52
Average MW of Wet Gas	26.88

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
B!	0.32	142	0.566	35.2
2	0.30	141	0.548	34.0
3	0.30	145	0.548	34.1
4	0.32	146	0.566	35.3
5	0.31	148	0.557	34.8
6	0.30	148	0.548	34.2
7	0.27	150	0.520	32.5
8	0.26	148	0.510	31.8
9	0.25	150	0.500	31.3
10	0.25	151	0.500	31.3
11	0.25	152	0.500	31.3
12	0.23	151	0.480	30.0
A1	0.27	147	0.520	32.4
2	0.28	148	0.529	33.0
3	0.28	148	0.529	33.0
4	0.27	147	0.520	32.4
5	0.25	146	0.500	31.2
6	0.26	146	0.510	31.8
7	0.27	147	0.520	32.4
8	0.27	145	0.520	32.4
9	0.29	144	0.539	33.5
10	0.30	144	0.548	34.1
11	0.30	144	0.548	34.1
12	0.27	143	0.520	32.3
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		146.71	0.53	32.85

Act Volumetric Flow Rate (acfm)	55735
Std. Volumetric Flow Rate (scfm)	48488
Dry Volumetric Flow Rate (dscfm)	37380

Method 2 Velocity Traverse

Run Number	3	Date	1/30/2016
Client/Plant	PCS	Operator	DM/FC
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #3	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.27	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.03	Corrected Baro. Pressure	29.93
		Abs. Stack Press. (in. Hg)	29.91

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.73	15.08	
Replicate 2			
Replicate 3			N2 Percent
Average	5.7	15.1	79.2

Moisture By: Saturation

Saturated Percent Moisture	22.34
Calculated Percent Moisture	22.34
Mole Frac of Dry Stack Gas	0.777
Average MW of Dry Gas	29.52
Average MW of Wet Gas	26.95

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
B1	0.31	141	0.557	34.5
2	0.32	141	0.566	35.1
3	0.30	142	0.548	34.0
4	0.29	143	0.539	33.4
5	0.30	144	0.548	34.0
6	0.28	146	0.529	32.9
7	0.26	149	0.510	31.8
8	0.27	150	0.520	32.5
9	0.25	151	0.500	31.3
10	0.24	151	0.490	30.6
11	0.24	151	0.490	30.6
12	0.22	150	0.469	29.3
A1	0.27	147	0.520	32.4
2	0.28	147	0.529	33.0
3	0.27	147	0.520	32.4
4	0.25	147	0.500	31.2
5	0.26	145	0.510	31.7
6	0.26	143	0.510	31.7
7	0.28	143	0.529	32.9
8	0.27	143	0.520	32.3
9	0.30	144	0.548	34.0
10	0.29	144	0.539	33.5
11	0.30	142	0.548	34.0
12	0.27	143	0.520	32.3
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		145.58	0.52	32.56

Act Volumetric Flow Rate (acfm)	55234
Std. Volumetric Flow Rate (scfm)	48142
Dry Volumetric Flow Rate (dscfm)	37389

AECOM

METHOD 30B

Run No. 1

Date	2/12/2016		Sorbent Trap Number	OL304643	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #3		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	RLM/LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	10	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	29.95	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	16:10:00	0.000		0.75	148	265	40	32		1
	5	16:15	3.63		0.75	149	260	47	32		1
	10	16:20	7.04		0.75	153	264	46	32		1
	15	16:25	10.47		0.75	152	276	47	32		1
	20	16:30	14.18		0.75	145	228	46	32		1
	25	16:35	17.83		0.75	152	234	47	32		1
	30	16:40	21.30		0.75	154	276	47	32		1
	35	16:45	24.70		0.75	155	272	48	32		1
	40	16:50	27.62		0.75	154	270	48	32		1
	45	16:55	30.35		0.75	155	260	47	32		1
	50	17:00	32.57		0.75	155	248	46	32		1
	55	17:05	35.43		0.75	158	235	47	32		1
	60	17:10	38.734		0.75	157	241	47	32		1
TOTAL			38.734	38.7340	0.75	153	256	46	32		1
Target Volume											
Spike Amount (ng)	2000										

Comments: Stack Temp for Run 1A and 1B is an average of Runs 2 and 3.

	Mechanical	Totalizer
Total Volume (L)	**41317.01902**	**41.317019**

AECOM

METHOD 30B

Run No. 1

Date	2/12/2016		Sorbent Trap Number	OL321218	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #3		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	RLM/LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	29.95	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	16:10:00	0.000		0.75	148	265	41	32		1
	5	16:15	3.89		0.75	149	260	48	32		2
	10	16:20	7.10		0.75	153	264	45	32		2
	15	16:25	11.06		0.75	152	276	45	32		2
	20	16:30	15.35		0.75	145	228	47	32		2
	25	16:35	19.21		0.75	152	234	48	32		2
	30	16:40	22.70		0.75	154	276	48	32		2
	35	16:45	25.30		0.75	155	272	47	32		2
	40	16:50	29.10		0.75	154	270	48	32		2
	45	16:55	31.70		0.75	155	260	48	32		2
	50	17:00	34.24		0.75	155	248	48	32		2
	55	17:05	37.38		0.75	158	235	48	32		2
	60	17:10	40.292		0.75	157	241	48	32		2
TOTAL			40.292	40.292	0.75	153	256	47	32		1.92
Target Volume											
Spike Amount (ng)											

Comments: Stack Temp for Run 1A and 1B is an average of Runs 2 and 3.

	Mechanical	Totalizer
Total Volume (L)	**42939.75348**	**42.9397535**

AECOM

METHOD 30B

Date	2/12/2016		Sorbent Trap Number	OL30466	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #3		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	RLM/LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	29.93	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	17:45:00	0.000		0.75	156	285	48	34		-1
	5	17:50	3.62		0.75	158	259	48	36		-1
	10	17:55	6.93		0.75	158	258	48	36		-1
	15	18:00	10.58		0.75	150	287	47	36		-1
	20	18:05	14.18		0.75	147	258	48	36		-1
	25	18:10	17.71		0.75	149	295	48	35		-1
	30	18:15	20.95		0.75	148	292	48	35		-1
	35	18:20	24.28		0.75	156	293	48	35		-1
	40	18:25	28.23		0.75	157	255	48	35		-1
	45	18:30	31.42		0.75	157	258	47	34		-1
	50	18:35	34.68		0.75	155	251	47	34		-1
	55	18:40	38.46		0.75	158	292	48	34		-1
	60	18:45	42.120		0.75	157	286	48	34		-1
TOTAL			42.1200	42.1200	0.75	154	274.54	47.77	34.92		-1.00
Target Volume											
Spike Amount (ng)	2000										

Comments:

	Mechanical	Totalizer
Total Volume (L)	**44776.30319**	**44.7763032**

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AECOM

METHOD 30B

Date	2/12/2016		Sorbent Trap Number	OL321027	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #3		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	RLM/LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	14	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	5	Barometric Pres. (" Hg)	29.93	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
A1	0	17:45:00	0.000		0.75	156	285	49	34		-1
	5	17:50	3.640		0.75	158	259	49	36		-1
	10	17:55	6.920		0.75	158	258	49	36		-1
	15	18:00	10.740		0.75	150	287	49	36		-1
	20	18:05	14.060		0.75	147	258	48	36		-1
	25	18:10	17.900		0.75	149	295	48	35		-1
	30	18:15	21.200		0.75	148	292	50	35		-1
	35	18:20	24.890		0.75	156	293	50	35		-1
	40	18:25	28.910		0.75	157	255	50	35		-1
	45	18:30	32.220		0.75	157	258	49	34		-1
	50	18:35	35.600		0.75	155	251	49	34		-1
	55	18:40	39.320		0.75	158	292	50	34		-1
	60	18:45	42.6800		0.75	157	286	49	34		-1
TOTAL			42.6800	42.6800	0.75	154.3076923	274.54	49.15	34.92		-1.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**45248.15406**	**45.2481541**

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AECOM

METHOD 30B

Run No. 3

Date	2/11/2016		Sorbent Trap Number	OL304565	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #3		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM		Minutes Per Point		K-factor		
Location Height	100		Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	19	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	29.93	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	19:05:00	0.000		0.75	153	263	44	34	260	1
	5	19:10	7.770		0.75	152	261	44	34	260	1
	10	19:15	11.270		0.75	155	249	44	34	248	1
	15	19:20	14.820		0.75	158	239	44	34	237	1
	20	19:25	18.350		0.75	152	232	42	34	239	1
	25	19:30	22.130		0.75	150	238	42	34	241	1
	30	19:35	25.560		0.75	149	231	42	34	243	1
	35	19:40	29.630		0.75	156	238	42	34	247	1
	40	19:45	33.230		0.75	149	281	42	34	251	1
	45	19:50	37.090		0.75	155	285	42	34	249	1
	50	19:55	41.120		0.75	155	286	42	34	250	1
	55	20:00	43.890		0.75	149	277	42	34	252	1
	60	20:05	47.4620		0.75	148	259	42	34	248	1
TOTAL			47.4620	47.4620	0.75	152	257	43	34	248	1
Target Volume											
Spike Amount (ng)	2000										

Comments:

	Mechanical	Totalizer
Total Volume (L)	**50972.90741**	**50.9729074**

AECOM

METHOD 30B

Run No. 3

Date	2/11/2016		Sorbent Trap Number	OL321450	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.022	
Location	Cal #3 Stack		Nozzle ID (inches)		DGM Cal Factor (Y)	1.022	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM		Minutes Per Point		K-factor		
Location Height	100		Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	15	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	29.93	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	19:05:00	0.000		0.75	153	263	48	34	260	1
	5	19:10	8.610		0.75	152	261	48	34	260	1
	10	19:15	12.250		0.75	155	249	47	34	248	1
	15	19:20	15.550		0.75	158	239	43	34	237	1
	20	19:25	19.140		0.75	152	232	43	34	239	1
	25	19:30	22.870		0.75	150	238	43	34	241	1
	30	19:35	26.310		0.75	149	231	43	34	243	1
	35	19:40	30.120		0.75	156	238	43	34	247	1
	40	19:45	33.360		0.75	149	281	43	34	251	1
	45	19:50	36.800		0.75	155	285	45	34	249	1
	50	19:55	40.370		0.75	155	286	43	34	250	1
	55	20:00	43.710		0.75	149	277	43	34	252	1
	60	20:05	47.7040		0.75	148	259	43	34	248	1
TOTAL			47.7040	47.7040	0.75	152.3846154	256.85	44.23	34.00	248.08	1.00
Target Volume											
Spike Amount (ng)											

Comments:

	Mechanical	Totalizer
Total Volume (L)	**51068.56883**	**51.0685688**

Test Run 1 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-12-2016 12:05:19	-0.022	-0.226
02-12-2016 12:06:19	-0.079	-0.231
02-12-2016 12:07:18	-0.086	-0.232
02-12-2016 12:08:18	-0.085	-0.235
Pause		
End Pause		
02-12-2016 12:10:18	19.328*	20.466
02-12-2016 12:11:18	19.395*	20.495
02-12-2016 12:12:18	19.398*	20.465
Pause		
End Pause		
02-12-2016 12:13:19	15.291*	13.576
02-12-2016 12:14:19	10.119	9.854
02-12-2016 12:15:19	10.096	9.856
02-12-2016 12:16:19	10.097	9.855
Pause		
End Pause		
~~02-12-2016 12:19:18~~	~~11.603~~	~~7.293~~
~~02-12-2016 12:20:18~~	~~13.949~~	~~6.063~~ DCM 2/12/16
~~02-12-2016 12:21:18~~	~~15.851~~	5.305
Pause		
End Pause		
02-12-2016 12:24:19	18.833	5.717
02-12-2016 12:25:19	19.318*	5.736
02-12-2016 12:26:19	19.692*	5.738
02-12-2016 12:27:18	19.959*	5.730
Pause		
End Pause		
~~02-12-2016 12:30:18~~	~~15.119~~	~~0.062~~ Dcm "Analyzer changing
02-12-2016 12:31:19	15.085	0.047
02-12-2016 12:32:19	15.083	0.047
02-12-2016 12:33:19	15.082	0.035
02-12-2016 12:34:18	15.079	0.030
Pause		
End Pause		
Run Averages	O2 %	CO2 %
02-12-2016 12:34:59	12.667*	6.008
Operator:	David Marzec	
Plant Name:	PCS Aurora	
Location:	Calciner #3	

Test Run 1 End

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AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402268	Date: 10-13-2016	Operator(s): RCM/WL
Location: Calc. #3	Condition: Normal	Run #: 1	Duration (min): 72
DGM#: N-54	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 3.	P_{bar} ("Hg): 30.26	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg) C.O	ft^3/min: 0.0	Vac. ("Hg): 12"	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0.0	Vac. ("Hg): 6"	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓		- P ("H_2O): ✓		Nozzle D1 (") Ø:
Probe & Pitot ID:					Nozzle D2 (") ⊘:
					Nozzle D3 (") ⊖:
					Average Nozzle D ("): .280

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
1	0944	0	999.301	.38	1.14	147			30	31	35	1
2		3	001.47	.32	1.15	139			30	32	34	1
3		6	003.02	.36	1.12	144			31	31	33	1
4		9	4.71	.3	1.03	146			31	32	35	1
5		12	6.23	.3	1.08	140			30	36	35	1
6		15	7.83	.33	1.2	141			31	35	35	1
7		18	9.43	.36	1.3	145			31	37	33	1
8		21	11.08	.34	1.24	144			32	37	33	1
9		24	14.29	.35	1.26	144			37	37	33	1
10		27	15.38	.34	1.22	145				37	33	2
11		30	16.98	.33	1.18	151			32	37	33	2
12		33	18.18	.33	1.2	142			32	35	34	2
	1019	36	19.89	.32	1.15	145			33	39	34	2
1	1024	39	20.98	.32	1.15	145			33	39	35	2
2		3	21.48	.40	1.4	151			36	39	35	2
3		6	23.22	.47	1.7	149			35	38	34	2
4		9	25.15	.51	1.84	150			34	36	35	3
5		12	27.12	.51	1.84	154			35	40	35	3
6		15	29.25	.46	1.65	155			36	40	35	3
7		18	31.19	.46	1.65	154			35	39	35	4
8		21	33.21	.40	1.4	153			35	40	35	5
9		24	35.15	.3	1.08	151			35	40	35	5
10		27	36.98	.28	1.0	144			35	40	36	5
11		30	38.35	.28	1.0	147			33	40	36	5
12		33	39.83	.24	0.86	139	↓	↓	33	39	36	5
	1057	36	341.05									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-12-16
Location: Cal #3	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	732.2	1033.6	
2	DI H_2O	100	GS	771.5	813.3	
3	Empty	--	MOD	668.8	672.1	
4	Silica Gel	--	MOD	857.8	864.6	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM	FIELD SAMPLING DATA SHEET	EPA Method 13A/B
		PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248	Date: 2-13-16	Operator(s): WL / LM
Location: Cyl. #3	Condition: Normal	Run #: 2	Duration (min): 72
DGM#: IN-54	CF (Yd): 1.8639	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 3.60	P_{bar} ("Hg): 30.28	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 10	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø:	
Probe & Pitot ID:			Nozzle D2 (") ⊘:	
			Nozzle D3 (") ⊖:	
			Average Nozzle D ("): .280	

Sample Point	Time		DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)						Pump Vac. ("Hg)
	Clock	Run (min)				Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	
Port												
A1	1220	0	041.751	.37	1.33	143			30	35	35	2
2		3	043.47	.32	1.15	150			30	36	35	1
3		6	045.10	.38	1.36	141			30	37	35	2
4		9	046.84	.30	1.08	150			31	38	35	1
5		12	048.33	.33	1.18	142			31	39	35	2
6		15	050.00	.33	1.18	138			31	39	35	2
7		18	051.58	.29	1.04	144			31	39	35	2
8		21	053.17	.38	1.36	146			31	39	35	2
9		24	054.96	.31	1.11	141			32	39	35	2
10		27	056.53	.32	1.15	146			31	39	35	2
11		30	058.18	.34	1.22	150			31	40	36	3
12		33	059.84	.28	1.00	147			31	40	36	3
	1256	36	061.435		Port	Change						
B1	1259		061.435	.53	1.90	151			31	39	36	5
2		39	063.50	.49	1.76	153			31	40	36	5
3		42	065.46	.53	1.90	153			32	41	36	5
4		45	067.53	.53	1.90	144			32	41	36	5
5		48	069.62	.48	1.72	148			33	41	36	5
6		51	071.58	.43	1.54	152			32	41	36	5
7		54	073.47	.36	1.29	149			33	41	36	4
8		57	075.23	.34	1.22	150			32	40	36	4
9		60	076.92	.27	.97	147			32	40	36	4
10		63	078.44	.29	1.04	144			32	40	36	4
11		66	080.02	.23	.82	143			31	40	36	3
12		69	081.45	.23	.82	147			31	40	36	3
	1335	72	082.849									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-13-16
Location: Cal #3	Condition: Normal	Run #: 2

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	767.4	961.8	
2	DI H_2O	100	GS	692.0	697.6	
3	Empty	--	MOD	643.9	643.6	
4	Silica Gel	--	MOD	904.5	909.4	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248	Date: 2-13-2016	Operator(s): RLM/WL
Location: Calcine #3	Condition: Normal	Run #: 3	Duration (min): 72
DGM#: N-54	CF (Yd): 1.0159	$\Delta H_@$: 1.5839	Cp: 0.84
K-Factor: 3.6	P_{bar} ("Hg): 30.28	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.0	Vac. ("Hg): 12"	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0.005	Vac. ("Hg): 12"	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): 0.0	- P ("H_2O): 0.0	Nozzle D1 (") Ø:	
Probe & Pitot ID:			Nozzle D2 (") ⊘:	
			Nozzle D3 (") ⊖:	
			Average Nozzle D ("): .280	

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A 1	1431	00	83.600	.47	1.55	153			35	39	38	1
2		3	85.42	.36	1.3	155			36	39	40	1
3		6	87.100	.32	1.2	157			35	38	41	1
4		9	88.76	.36	1.3	154			37	42	38	1
5		12	90.47	.24	.86	155			38	43	38	1
6		15	91.88	.45	1.62	155			39	43	38	1
7		18	93.70	.37	1.33	153			40	42	37	1
8		21	95.43	.35	1.26	156			41	43	39	1
9		24	97.14	.35	1.26	151			40	43	39	1
10		27	98.82	.37	1.33	141			41	43	39	4
11		30	100.57	.42	.95	145			41	43	39	5
12		33	102.07	.35	1.26	150			40	43	39	5
	1507	36	103.857									
			103.857	.52	4.8	151						
B 1	1510	00	↓	↓	↓	↓			36	41	39	5
2		3 42	105.77	.40	1.44	152			37	42	39	5
3		42 45	107.61	.50	1.8	152			38	42	38	6
4		45 48	109.67	.45	1.62	150			37	42	39	7
5		48 51	111.60	.56	2.0	145			35	42	38	7
6		51 54	113.70	.54	1.94	145			35	42	38	7
7		54 57	115.83	.39	1.4	148			38	42	38	8
8		57 60	117.67	.40	1.44	141			38	41	38	8
9		60 63	119.45	.35	1.15	151			39	41	38	8
10		63 66	121.31	.25	0.9	160			39	41	38	8
11		66 69	122.81	.25	1.00	154			38	41	37	8
12		69 72	124.34	.31	1.11	149			38	40	37	8
	1545	72	125.954									

COMMENTS ~25F° wind 25-30 MPH! Held pen against stack so it would work.

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-11-16
Location: Cal #3	Condition: Normal	Run #: #3

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
				PC		
1	DI H_2O	100	MOD	~~1026.4~~ 644.7	874.1	
2	DI H_2O	100	GS	~~730.5~~ 763.2	889.2	
3	Empty	--	MOD	~~656.2~~ 656.8	663.2	
4	Silica Gel	--	MOD	~~901.0~~ 905.1	913.6	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

Plant Name PCS	Date 02-12-2016	Page 1 of 1	
Project Number	Condition NORMAL	Initial Leak Rate	1) 0.0 @ 10 "Hg
Location (Source) CALCINER 3	Run #1		2) 0.0 @ 10 "Hg
Meter ID & Cal Factors YC260 M30B BOX #1	Operator RUM, LB	Final Leak Rate	1) @ "Hg
Sorbent Trap IDs 1)	Bar. Press. (in. H_2O)		2) @ "Hg
2)	Elevation (relative to Barometer) (ft)	Third Bed Spike Level	1)
			2)

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	STACK ΔP (in. H_2O)	TRAP Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	0	000	0.75	148	265	32		40	1
2)	1610							41	1
1)	5			149	260	32		47	1
2)	1615							48	2
1)	10	7.04	0.75	153	264	32		46	1
2)	1620	7.1						45	2
1)	15	10.47		152	276	32		47	1
2)	1625	11.06						45	2
1)	20	14.18		145	278	32		46	1
2)	1630	15.35						47	2
1)	25	17.83		152	234	32		47	1
2)	1635	19.21						45	2
1)	30	21.3		154	276	32		47	1
2)	1640	22.7						45	2
1)	35	[illegible]		155	272	32		48	1
2)	1645	[illegible]						47	2
1)	40	27.62		154	270	32		48	1
2)	1650	29.60						48	2
1)	45	30.35		155	260	32		47	1
2)	1655	31.7						48	2
1)	50	32.157		155	248	32		46	1
2)		34.294						48	2
1)	55	35.43		158	235	32		47	1
2)		37.35						48	2
1)	60	38.734							
2)	1710	40.292							
1)									
2)									
1)									
2)									

Comments:

AECOM

Plant Name PCS	Date 2-11-2016	Page 1 of 1	
Project Number	Condition NORMAL	Initial Leak Rate	1) 0.0 @ 20 "Hg; 2) 0.0 @ 14 "Hg
Location (Source) CALCINER #3	Run #2		
Meter ID & Cal Factors 802494/802663	Operator RLM, LB	Final Leak Rate	1) 0.0 @ 7 "Hg; 2) 0.0 @ 5 "Hg
Sorbent Trap IDs 1) 2)	Bar. Press. (in. H_2O)		
	Elevation (relative to Barometer) (ft)	Third Bed Spike Level	1) 2)

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	Stack ΔP (in. H_2O)	Temperature (°F) Trap Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1745 0	000	.75	156	285	34		48	-1
2)		000	.75					49	-1
1)	5	3.62	.75	158	259	36		48	-1
2)		3.64	.75					49	-1
1)	10	6.93	.75	158	258	36		48	-1
2)		6.92	.75					49	-1
1)	15	10.58	.75	150	287	36		47	-1
2)		10.74	.75					49	-1
1)	20	14.18	.75	147	258	36		48	-1
2)		14.06	.75					48	-1
1)	25	17.71	.75	149	295	35		48	-1
2)		17.90	.75					48	-1
1)	30	20.95	.75	148	292	35		48	-1
2)		21.20	.75					50	-1
1)	35	24.29	.75	156	293	35		48	-1
2)		24.89	.75					50	-1
1)	40	28.23	.75	157	255	35		48	-1
2)		28.91	.75					50	-1
1)	45	31.42	.75	157	258	34		47	-1
2)		32.22	.75					49	-1
1)	50	34.68	.75	155	251	34		47	-1
2)		35.60	.75					49	-1
1)	55	38.46	.75	158	292	34		48	-1
2)		39.32	.75					50	-1
1)	1845 60	42.12	.75	157	286	34		48	-1
2)		42.68	.75					49	-1
1)									
2)									
1)									
2)									

Comments:

AECOM

Plant Name	PC3	Date	2-11-14	Page	1 of 1
Project Number	60240235.10	Condition	Normal	Initial Leak Rate	1) 0.0 @ 19 "Hg; 2) 0.0 @ 15 "Hg
Location (Source)	Calciner #3	Run	#3		
Meter ID & Cal Factors	8802484 / 8802483	Operator	DM	Final Leak Rate	1) 0.0 @ "Hg; 2) 0.0 @ "Hg
Sorbent Trap IDs	1) OL3041565 spike; 2) OL3211450	Bar. Press. (in. H_2O)			
		Elevation (relative to Barometer) (ft)	100	Third Bed Spike Level	1) 2000 ug spike; 2)
		Stack (°F)			

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1905	0.000	.75	153	263	34	260	41	1
2)		0.000	.75					48	1
1)	1910	7.79	.75	152	261	34	260	44	1
2)		8.161	.75					48	1
1)	1915	11.27	.75	155	249	34	248	44	1
2)		12.25	.75					47	1
1)	1920	14.82	.75	158	239	34	237	44	1
2)		15.55	.75					43	1
1)	1925	18.35	.75	152	232	34	239	42	1
2)		19.14	.75					43	1
1)	1930	22.13	.75	150	238	34	241	42	1
2)		22.87	.75					43	1
1)	1935	25.56	.75	149	231	34	243	42	1
2)		26.31	.75					43	1
1)	1940	29.63	.75	156	238	34	247	42	1
2)		30.12	.75					43	1
1)	1945	33.23	.75	149	281	34	257	42	1
2)		33.36	.75					43	1
1)	1950	37.09	.75	155	285	34	249	42	1
2)		36.80	.75					45	1
1)	1955	41.12	.75	155	284	34	250	42	1
2)		40.37	.75					43	1
1)	2000	43.89	.75	149	277	34	252	42	1
2)		43.71	.75					43	1
1)	2005	47.462	.75	148	259	34	248	42	1
2)		47.704	.75					43	1
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

A-4 Calciner No. 4

PCS Phosphate Operations - Stack Test Results

Green indicates hard entry

Test Information

Location	Calciner No. 4
Product	Single Float Calcined Rock
Source	WESP
Stack ID No.	204
Start Date	2/3/2016
Pollutant	Particulate
Method	5/202

Production Data

Date	2/3/2016	2/3/2016	2/9/2016
Feed Rate, Wet, TPH (During Test)	63.6	63.6	67.4
Bulk Moisture of Rock (Lab Analyses)	12.30%	12.30%	13.00%
Rock Feed Rate Dry, TPH	55.8	55.8	58.6
Lbs. Coal/Ton of Dry Feed	40.22	40.22	40.22
Coal Feed, TPH	1.12	1.12	1.18
Process Weight Rate, TPH	56.9	56.9	59.8
Loss On Ignition	3.36%	3.36%	3.36%
Production Rate During Test, TPH Product	53.9	53.9	56.7

Test Parameters/Conditions

	Run 1	Run 2	Run 3	Average
Time of Start	10:02	12:30	09:37	N/A
Time of Finish	11:19	14:19	10:59	N/A

Stack Gas Flow Rate Calculations

Stack Flow Rate, DSCFM	36,550	36,726	40,574	37,950
Sample Volume (DSCF)	38.310	38.024	41.244	39.193

Condensable

Particulate Determination, Inorganic Fraction

	Run 1	Run 2	Run 3	Average
Net Sample Weight, mg	14.81	20.64	7.06	N/A

Condensable

Particulate Determination, Organic Fraction

Net Sample Weight, mg	3.45	11.23	1.04	N/A
Train Blank, mg		2.60		N/A
CPM, mg/DSCF	0.4244	0.7856	0.1479	0.4526

Particulate Determination, Filterable

Beaker Final Weight, mg	0.61	1.90	1.36	N/A
Final Filter Weight, mg	5.20	41.46	3.53	N/A
Net Sample Weight, mg	5.81	43.36	4.89	N/A
Mg Particulate/DSCF	0.1517	1.1403	0.1186	0.4702
Mg Particulate/DSCF, Averaged for Wash Cycle Procedures				0.1854
grams/DSCM	0.0054	0.0403	0.0042	0.0166

Total Particulate Determination

PM Emission Rate, Lbs./Hr - Filterable	0.73	5.54	0.64	2.30
PM Emission Rate, Lbs./Hr - Condensable-Inorganic	1.87	2.64	0.92	1.81
PM Emission Rate, Lbs./Hr - Condensable-Organic	0.44	1.43	0.14	0.67
PM Emission Rate, Lbs./Hr -Total Condensable (corrected with train blank)	2.05	3.82	0.79	2.22
PM Emission Rate, Lbs./Hr - Total Particulate	2.79	9.36	1.43	4.52
Average Daily PM Emission Rate, Lbs./Hr - Filterable				0.928
Average Daily PM Emission Rate, Lbs./Hr -Condensible				1.543
Average Daily PM Emission Rate, Lbs./Hr - Total Particulate				2.470
PM Emission Rate, Lbs./Day				59.283
PM Emission Rate, grams/dscm				0.0065
PM Emission Rate, grains/dscf				0.003
Allowable PM Rate, grain/dscf				0.080

Data For Avg Daily Emission Rate Calculation (inputs in red cells only)

Total PM lbs/hr

Total PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	9.36
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Total PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	2.11

Filterable PM lbs/hr

Filterable PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	5.54
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	0.68

Condensible PM lbs/hr

Condensible PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	3.82
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Condensible PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.42

PM Emission rate g/dscm

Filterable PM g/dscm Run with wash (enter cell address) ($E_{s)}$	0.04
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM g/dscm Avg of two non-wash runs (enter cell addresses)(E_N)	0.00

PM Emission rate mg/dscf

Filterable PM mg/dscf Run with wash (enter cell address) ($E_{s)}$	1.14
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM mg/dscf Avg of two non-wash runs (enter cell addresses)(E_N)	0.14

***Water Wash Performed on Run 2**

(R=24hrs)

$E_{avg} = E_s S\ (A+B)/AR) + E_N\ (((R-S)/R)-(BS/AR))$

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00346

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 4**
Condition	**Normal**
Sample Type:	**Method 5/202**

Run Number: / Date:	1 3-Feb-16	2 3-Feb-16	3 9-Feb-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	30.01	29.98	29.59	29.86
Absolute Stack Pressure (in H2O)	29.99	29.96	29.57	29.84
Stack Static Pressure (in H2O)	-0.26	-0.24	-0.24	-0.25
Average Stack Temperature (°F)	151.2	150.8	145.0	149.0
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	38.685	38.399	39.502	38.862
Average Meter Pressure (in H2O)	0.98	0.95	1.06	0.99
Average Meter Temperature (°F)	86.2	85.6	50.9	74.3
Moisture Collected (g)	299.3	293.7	233.1	275.4
Carbon Dioxide Concentration (%V)	6.0	6.0	6.0	6.0
Oxygen Concentration (%V)	15.1	15.1	15.1	15.1
Nitrogen Concentration (%V)	78.9	78.9	78.9	78.9
Dry Gas Meter Factor (J_G)	1.0189	1.0189	1.0189	1.0189
Nozzle Diameter (in)	0.269	0.269	0.269	0.269
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.532	0.528	0.573	0.544
Standard Metered Volume (dscf)	38.310	38.024	41.244	39.192
Standard Metered Volume (dscm)	1.085	1.077	1.168	1.110
Stack Moisture (%V)	26.9	26.7	21.0	24.9
Saturated Moisture (%V)	25.9	25.3	22.6	24.6
Mole Fraction Dry Stack Gas	0.741	0.747	0.790	0.759
Dry Molecular Weight	29.56	29.56	29.56	29.56
Wet Molecular Weight	26.57	26.64	27.13	26.78
Average SQRT of Delta P	0.53	0.53	0.56	0.54
Stack Gas Velocity (fps)	33.6	33.5	35.1	34.0
Stack Gas Velocity (mps)	10.2	10.2	10.7	10.4
Volumetric Flow Rate (acfm)	56940	56766	59572	57759
Volumetric Flow Rate (acmm)	1613	1608	1687	1636
Volumetric Flow Rate (dscfm)	36550	36726	40574	37950
Volumetric Flow Rate (dscmm)	1035	1040	1149	1075
Percent Isokinetic	104.4	103.1	101.5	103.0
Post Test Meter QA (J_{qa})	1.0142	1.0080	1.0030	1.0084

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 4
Condition	Normal
Meter Box Number	N-55
Meter Factor (J_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	30.11

Date	2/3/2016
Operator	DM/RLM
Run Number	1
K Factor	3.47
Meter ' $H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.26
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	
Nozzle ID 2 (in)	
Nozzle ID 3 (in)	
Nozzle ID (in)	0.269

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.0	15.1	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	485.3	766.5	281.2
Impinger 2	547.5	547.3	-0.2
Impinger 3	707.2	713.0	5.8
Impinger 4	888.9	901.4	12.5
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			299.3
Pitot Tube ID			8-4
Saturated Percent Moisture		25.87	Standard
Calculated Percent Moisture		26.92	Volume (dscf)
Isokinetic %		104.4	38.3

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (' P) (in H2O)	Orifice Pressure Diff (' H) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	10:02:00	859.691	0.30	1.00	144	82	82
A2	3	10:05:00	861.300	0.27	0.94	151	84	82
A3	6	10:08:00	862.900	0.27	0.94	154	85	82
A4	9	10:11:00	864.500	0.38	1.30	154	86	83
A5	12	10:14:00	866.200	0.25	0.86	153	87	83
A6	15	10:17:00	867.800	0.27	0.94	150	88	83
A7	18	10:20:00	869.400	0.23	0.80	152	88	84
A8	21	10:23:00	870.900	0.27	0.80	153	89	84
A9	24	10:26:00	872.300	0.30	1.00	151	89	84
A10	27	10:29:00	874.000	0.32	1.10	151	90	85
A11	30	10:32:00	875.600	0.35	1.20	146	90	85
A12	33	10:35:00	877.300	0.36	1.20	154	90	85
STOP	36	10:38:00	879.122					
B1	36	10:43:00	879.275	0.30	1.00	152	88	85
B2	39	10:46:00	880.800	0.28	0.97	145	89	85
B3	42	10:49:00	882.400	0.28	0.97	152	89	85
B4	45	10:52:00	884.100	0.27	0.94	146	89	85
B5	48	10:55:00	885.700	0.28	0.97	156	89	85
B6	51	10:58:00	887.300	0.26	0.90	153	89	85
B7	54	11:01:00	888.900	0.29	1.00	151	89	85
B8	57	11:04:00	890.600	0.27	0.94	145	89	85
B9	60	11:07:00	892.100	0.27	0.94	153	89	85
B10	63	11:10:00	893.800	0.27	0.94	152	89	85
B11	66	11:13:00	895.400	0.27	0.94	155	89	85
B12	69	11:16:00	896.900	0.25	0.87	155	89	85
	72	11:19:00	898.529					

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 4
Condition	Normal
Meter Box Number	N-55
Meter Factor (J_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	30.08

Date	2/3/2016
Operator	DM/RLM
Run Number	2
K Factor	3.30
Meter ' $H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.269
Nozzle ID 2 (in)	0.269
Nozzle ID 3 (in)	0.269
Nozzle ID (in)	0.269

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.0	15.1	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	503.1	769.2	266.1
Impinger 2	594.1	594.3	0.2
Impinger 3	691.0	703.7	12.7
Impinger 4	901.8	916.5	14.7
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			293.7
Pitot Tube ID			8-4
Saturated Percent Moisture		25.27	Standard
Calculated Percent Moisture		26.70	Volume (dscf)
Isokinetic %		103.1	38.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (' P) (in H2O)	Orifice Pressure Diff (' H) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	12:30:00	901.267	0.28	0.98	151	85	83
B2	3	12:33:00	902.850	0.30	1.00	154	87	83
B3	6	12:36:00	904.500	0.26	0.90	150	87	83
B4	9	12:39:00	906.100	0.30	1.00	145	88	83
B5	12	12:42:00	907.800	0.24	0.83	152	88	84
B6	15	12:45:00	909.250	0.25	0.87	151	88	84
B7	18	12:48:00	910.700	0.37	1.20	154	89	84
B8	21	12:51:00	912.450	0.32	1.10	146	89	84
B9	24	12:54:00	914.100	0.37	1.20	152	89	84
B10	27	12:57:00	915.850	0.27	0.89	146	89	84
B11	30	13:00:00	917.500	0.29	0.96	148	89	84
B12	33	13:03:00	919.000	0.27	0.89	148	89	84
STOP	36	13:06:00	920.614					
A1	36	13:43:00	920.660	0.29	0.96	150	85	84
A2	39	13:46:00	922.300	0.27	0.89	151	85	84
A3	42	13:49:00	923.900	0.29	0.96	154	86	84
A4	45	13:52:00	925.400	0.27	0.89	150	87	84
A5	48	13:55:00	927.000	0.28	0.98	155	87	83
A6	51	13:58:00	928.650	0.25	0.83	154	87	84
A7	54	14:01:00	930.200	0.29	0.96	145	88	84
A8	57	14:04:00	931.800	0.27	0.89	149	88	84
A9	60	14:07:00	933.400	0.26	0.86	153	88	84
A10	63	14:10:00	934.950	0.30	0.99	154	88	84
A11	66	14:13:00	936.500	0.27	0.89	155	88	84
A12	69	14:16:00	938.150	0.27	0.89	151	87	83
	72	14:19:00	939.712					

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 4
Condition	Normal
Meter Box Number	N-55
Meter Factor (J_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	29.69

Date	2/9/2016
Operator	DM/RLM
Run Number	3
K Factor	3.30
Meter ' $H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.264
Nozzle ID 2 (in)	0.273
Nozzle ID 3 (in)	0.269
Nozzle ID (in)	0.269

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.0	15.1	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	502.7	687.9	185.2
Impinger 2	592.5	620.6	28.1
Impinger 3	702.0	710.5	8.5
Impinger 4	928.1	939.4	11.3
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			233.1
Pitot Tube ID			8-4
Saturated Percent Moisture		22.59	Standard
Calculated Percent Moisture		21.04	Volume (dscf)
Isokinetic %		101.5	41.2

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (' P) (in H2O)	Orifice Pressure Diff (' H) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	9:37:00	940.123	0.31	1.00	149	48	47
A2	3	9:40:00	942.200	0.33	1.10	144	48	47
A3	6	9:43:00	943.850	0.31	1.00	148	50	47
A4	9	9:46:00	945.450	0.28	0.93	145	51	48
A5	12	9:49:00	946.950	0.29	0.96	142	52	47
A6	15	9:52:00	948.600	0.27	0.89	149	52	48
A7	18	9:55:00	950.100	0.31	1.00	147	53	48
A8	21	9:58:00	951.850	0.30	0.99	148	52	48
A9	24	10:01:00	953.350	0.30	0.99	142	53	48
A10	27	10:04:00	955.150	0.27	0.89	145	53	48
A11	30	10:07:00	956.500	0.31	1.00	143	53	48
A12	33	10:10:00	958.100	0.30	0.99	150	53	48
STOP	36	10:13:00	959.745					
B1	36	10:23:00	960.296	0.42	1.40	139	52	49
B2	39	10:26:00	961.950	0.45	1.50	141	53	49
B3	42	10:29:00	963.900	0.39	1.30	147	54	49
B4	45	10:32:00	965.600	0.43	1.40	144	55	49
B5	48	10:35:00	967.400	0.40	1.30	147	56	50
B6	51	10:38:00	969.200	0.38	1.30	145	56	50
B7	54	10:41:00	970.950	0.32	1.10	144	56	50
B8	57	10:44:00	972.600	0.27	0.89	146	55	50
B9	60	10:47:00	974.200	0.26	0.86	139	55	50
B10	63	10:50:00	975.700	0.25	0.83	146	55	50
B11	66	10:53:00	977.150	0.26	0.86	145	55	50
B12	69	10:56:00	978.650	0.26	0.86	145	55	51
	72	10:59:00	980.176					

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 4**
Condition	**Normal**
Sample Type:	**Method 13B**

Run Number: / Date:	1 1-Feb-16	2 1-Feb-16	3 1-Feb-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	29.85	29.82	29.83	29.83
Absolute Stack Pressure (in H2O)	29.83	29.80	29.81	29.81
Stack Static Pressure (in H2O)	-0.26	-0.26	-0.26	-0.26
Average Stack Temperature (°F	151.1	152.5	152.7	152.1
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	32.821	33.896	34.366	33.694
Average Meter Pressure (in H2O)	0.73	0.73	0.75	0.73
Average Meter Temperature (°F	81.5	84.7	83.3	83.1
Moisture Collected (g)	269.7	257.0	254.6	260.4
Carbon Dioxide Concentration (%V)	6.0	6.0	6.0	6.0
Oxygen Concentration (%V)	15.1	15.1	15.1	15.1
Nitrogen Concentration (%V)	78.9	78.9	78.9	78.9
Dry Gas Meter Factor (γ_δ)	1.0189	1.0189	1.0189	1.0189
Nozzle Diameter (in)	0.240	0.240	0.240	0.240
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.453	0.464	0.472	0.463
Standard Metered Volume (dscf)	32.591	33.428	33.993	33.337
Standard Metered Volume (dscm)	0.923	0.947	0.963	0.944
Stack Moisture (%V)	28.1	26.6	26.1	26.9
Saturated Moisture (%V)	26.0	26.7	26.7	26.5
Mole Fraction Dry Stack Gas	0.740	0.734	0.739	0.738
Dry Molecular Weight	29.56	29.56	29.56	29.56
Wet Molecular Weight	26.55	26.49	26.55	26.53
Average SQRT of Delta P	0.56	0.56	0.57	0.56
Stack Gas Velocity (fps)	35.4	35.5	36.0	35.6
Stack Gas Velocity (mps)	10.8	10.8	11.0	10.9
Volumetric Flow Rate (acfm)	60051	60209	61058	60439
Volumetric Flow Rate (acmm)	1701	1705	1729	1712
Volumetric Flow Rate (dscfm)	38272	37942	38743	38319
Volumetric Flow Rate (dscmm)	1084	1075	1097	1085
Percent Isokinetic	106.2	109.9	109.4	108.5
Post Test Meter QA (γ_{qa})	1.0299	1.0012	1.0003	1.0105

Fluoride Emission Rate Calculations

				Average
Orion 901 Meter Reading, ppm	0.178	0.189	0.193	N/A
Liquid Sample Volume, ml	1000	1000	1000	N/A
Sample Aliquot	10	10	10	N/A
Sample Dilution	10	10	10	N/A
Total Fluoride, mg	0.1780	0.1890	0.1930	0.1867
Fluoride Concentration, mg/DSCF	0.0055	0.0057	0.0057	0.0056
Fluoride Emissions, lbs F/hr	0.0276	0.0284	0.0291	0.0284
Rock Feed (Wet TPH)	67.9	67.9	67.9	67.9
Fluoride Emissions, lbs F/Ton Rock Feed	0.0004	0.0004	0.0004	0.0004

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 4
Condition	Normal
Meter Box Number	N-55
Meter Factor (γ_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	29.95

Date	2/1/2016
Operator	WL\BM
Run Number	1
K Factor	2.32
Meter $\Delta H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.26
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.241
Nozzle ID 2 (in)	0.240
Nozzle ID 3 (in)	0.240
Nozzle ID (in)	0.240

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.0	15.1	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	616.3	847.7	231.4
Impinger 2	714.4	741.3	26.9
Impinger 3	656.1	659.2	3.1
Impinger 4	929.2	937.5	8.3
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			269.7
Pitot Tube ID			6-4
Saturated Percent Moisture		26.01	Standard
Calculated Percent Moisture		28.07	Volume (dscf)
Isokinetic %		106.2	32.6

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	12:50:00	757.610	0.31	0.71	130	78	79
A2	3	12:53:00	758.640	0.29	0.67	148	78	78
A3	6	12:56:00	759.380	0.32	0.74	149	78	79
A4	9	12:59:00	760.770	0.35	0.81	152	79	79
A5	12	12:16:00	762.220	0.30	0.69	153	80	79
A6	15	12:19:00	763.580	0.30	0.69	153	81	79
A7	18	12:22:00	764.950	0.27	0.62	155	81	79
A8	21	12:25:00	766.320	0.27	0.62	152	81	79
A9	24	12:28:00	767.640	0.29	0.67	152	81	79
A10	27	12:31:00	768.990	0.29	0.67	147	83	79
A11	30	12:34:00	770.310	0.30	0.69	152	83	80
A12	33	12:37:00	771.680	0.31	0.71	153	83	80
STOP	36	12:40:00	773.089					
B1	36	13:29:00	773.087	0.37	0.85	152	83	80
B2	39	13:32:00	774.620	0.36	0.83	154	83	80
B3	42	13:35:00	776.130	0.36	0.83	155	84	80
B4	45	13:38:00	777.630	0.33	0.76	152	84	80
B5	48	13:41:00	779.070	0.39	0.90	154	85	81
B6	51	13:44:00	780.580	0.32	0.74	155	85	81
B7	54	13:47:00	782.020	0.31	0.71	150	86	81
B8	57	13:50:00	783.430	0.27	0.62	151	86	81
B9	60	13:53:00	784.760	0.37	0.85	153	87	81
B10	63	13:56:00	786.270	0.32	0.74	152	87	81
B11	66	13:59:00	787.730	0.30	0.69	153	88	82
B12	69	14:02:00	789.090	0.28	0.64	150	88	82
	72	14:05:00	790.429					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 4
Condition	Normal
Meter Box Number	N-55
Meter Factor (γ_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	29.92

Date	2/1/2016
Operator	WL\BM
Run Number	2
K Factor	2.32
Meter $\Delta H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.26
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.241
Nozzle ID 2 (in)	0.240
Nozzle ID 3 (in)	0.240
Nozzle ID (in)	0.240

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.0	15.1	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	767.5	996.2	228.7
Impinger 2	673.0	691.6	18.6
Impinger 3	642.0	644.5	2.5
Impinger 4	907.0	914.2	7.2
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			257.0
Pitot Tube ID			6-4
Saturated Percent Moisture		26.69	Standard
Calculated Percent Moisture		26.61	Volume (dscf)
Isokinetic %		109.9	33.4

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading 791	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Tm out (F)
B1	0	14:29:00	790.819	0.35	0.81	156	84	83
B2	3	14:32:00	792.340	0.38	0.88	157	85	83
B3	6	14:35:00	793.870	0.39	0.90	156	86	83
B4	9	14:38:00	795.450	0.33	0.76	145	87	83
B5	12	14:41:00	796.870	0.32	0.74	147	87	84
B6	15	14:44:00	798.310	0.32	0.74	152	88	84
B7	18	14:47:00	799.740	0.35	0.81	154	88	84
B8	21	14:50:00	801.210	0.29	0.67	156	89	84
B9	24	14:53:00	802.580	0.41	0.95	155	89	84
B10	27	14:56:00	804.210	0.32	0.74	154	89	84
B11	30	14:59:00	805.590	0.30	0.69	156	89	84
B12	33	15:02:00	806.970	0.28	0.64	154	89	84
STOP	36	15:05:00	808.316					
A1	36	15:08:00	808.316	0.33	0.76	155	82	83
A2	39	15:11:00	809.130	0.32	0.74	149	82	83
A3	42	15:14:00	811.170	0.28	0.64	155	82	83
A4	45	15:17:00	812.460	0.29	0.67	154	83	83
A5	48	15:20:00	813.850	0.30	0.69	148	84	83
A6	51	15:23:00	815.230	0.31	0.71	145	85	83
A7	54	15:26:00	816.630	0.29	0.67	153	86	83
A8	57	15:29:00	818.010	0.29	0.67	148	86	83
A9	60	15:32:00	819.370	0.27	0.62	152	86	83
A10	63	15:35:00	820.800	0.26	0.60	153	86	83
A11	66	15:38:00	822.020	0.28	0.64	154	86	83
A12	69	15:41:00	823.380	0.28	0.64	152	86	83
	72	15:44:00	824.715					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 4
Condition	Normal
Meter Box Number	N-55
Meter Factor (γ_d)	1.0189
Minutes per Point	3.0
Barometric Pressure	29.93

Date	2/1/2016
Operator	WL\BM
Run Number	3
K Factor	2.32
Meter $\Delta H_@$	1.8639
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.26
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.241
Nozzle ID 2 (in)	0.240
Nozzle ID 3 (in)	0.240
Nozzle ID (in)	0.240

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	6.0	15.1	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	635.6	864.1	228.5
Impinger 2	723.9	738.6	14.7
Impinger 3	656.6	658.4	1.8
Impinger 4	871.7	881.3	9.6
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			254.6
Pitot Tube ID			6-4
Saturated Percent Moisture		26.68	Standard
Calculated Percent Moisture		26.10	Volume (dscf)
Isokinetic %		109.4	34.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	17:25:00	824.965	0.29	0.67	152	83	83
A2	3	17:28:00	826.350	0.31	0.71	151	83	83
A3	6	17:31:00	827.760	0.33	0.76	155	84	82
A4	9	17:34:00	829.270	0.32	0.74	156	84	82
A5	12	17:37:00	830.610	0.34	0.78	156	85	82
A6	15	17:40:00	832.050	0.33	0.76	152	85	82
A7	18	17:43:00	833.480	0.33	0.76	153	85	82
A8	21	17:46:00	834.930	0.29	0.67	154	85	82
A9	24	17:49:00	836.280	0.31	0.71	141	86	82
A10	27	17:52:00	837.710	0.33	0.76	152	86	82
A11	30	17:55:00	839.140	0.32	0.74	153	86	82
A12	33	17:58:00	840.570	0.28	0.64	154	86	82
STOP	36	18:01:00	841.925					
B1	36	18:03:00	841.925	0.42	0.97	154	85	81
B2	39	18:06:00	843.570	0.36	0.83	154	85	81
B3	42	18:09:00	845.080	0.35	0.81	153	85	81
B4	45	18:12:00	846.490	0.33	0.76	153	85	81
B5	48	18:15:00	847.960	0.34	0.78	150	85	81
B6	51	18:18:00	849.420	0.34	0.78	148	85	81
B7	54	18:21:00	851.000	0.32	0.74	151	85	81
B8	57	18:24:00	852.340	0.33	0.76	152	85	81
B9	60	18:27:00	853.770	0.33	0.76	155	85	81
B10	63	18:30:00	855.220	0.31	0.71	156	85	81
B11	66	18:33:00	856.620	0.30	0.69	156	85	81
B12	69	18:36:00	857.970	0.29	0.67	154	85	81
	72	18:39:00	859.331					

AECOM

EPA Method 30B Emission Results

PCS Phosphate
Calciner #4
Mercury
Emission Calculations

O_2 Correction Basis: 3

Pollutant: Mercury

Run	Total Hg Catch ng	Sample Volume dscm	Hg Concentration mg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration mg/dscm @ 3%	Flow Rate dscfm
1	2401	0.049	0.0494	0.0059	15.1	0.153	38,250
2	2065	0.046	0.0453	0.0054	15.1	0.140	37,575
3	2149	0.046	0.0471	0.0056	15.1	0.146	40,677
AVERAGE	**2205**	**0.047**	**0.0473**	**0.0057**	**15.1**	**0.146**	**38,834**

Method 2 Velocity Traverse

Run Number	1	Date	2/10/2016
Client/Plant	PCS	Operator	LB
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #4	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.28	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	29.89	Corrected Baro. Pressure	29.79
		Abs. Stack Press. (in. Hg)	29.77

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.99	15.11	
Replicate 2			
Replicate 3			N2 Percent
Average	6.0	15.1	78.9

Moisture By: Saturation

Saturated Percent Moisture	26.72
Calculated Percent Moisture	26.72
Mole Frac of Dry Stack Gas	0.733
Average MW of Dry Gas	29.56
Average MW of Wet Gas	26.47

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.26	154	0.510	32.3
2	0.33	148	0.574	36.2
3	0.35	147	0.592	37.3
4	0.34	147	0.583	36.7
5	0.35	148	0.592	37.3
6	0.33	146	0.574	36.2
7	0.36	150	0.600	37.9
8	0.34	151	0.583	36.9
9	0.37	150	0.608	38.4
10	0.32	151	0.566	35.8
11	0.33	151	0.574	36.3
12	0.14	151	0.374	23.7
B1	0.32	154	0.566	35.9
2	0.37	153	0.608	38.5
3	0.41	153	0.640	40.6
4	0.42	153	0.648	41.0
5	0.43	157	0.656	41.7
6	0.43	157	0.656	41.7
7	0.38	156	0.616	39.1
8	0.32	156	0.566	35.9
9	0.28	155	0.529	33.6
10	0.27	155	0.520	33.0
11	0.21	153	0.458	29.0
12	0.16	153	0.400	25.3
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		152.04	0.57	35.85

Act Volumetric Flow Rate (acfm)	60810
Std. Volumetric Flow Rate (scfm)	52196
Dry Volumetric Flow Rate (dscfm)	38250

Method 2 Velocity Traverse

Run Number	2
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #4
Condition	Normal
Static Pressure (Ps)	-0.28
Location Height (ft)	100
Barometric Pressure	29.88

Date	2/10/2016
Operator	LB
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	29.78
Abs. Stack Press. (in. Hg)	29.76

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	5.99	15.11	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Moisture By: Saturation

Saturated Percent Moisture	28.07
Calculated Percent Moisture	28.07
Mole Frac of Dry Stack Gas	0.719
Average MW of Dry Gas	29.56
Average MW of Wet Gas	26.32

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.24	154	0.490	31.1
2	0.28	155	0.529	33.7
3	0.32	157	0.566	36.1
4	0.35	156	0.592	37.7
5	0.36	157	0.600	38.2
6	0.35	154	0.592	37.6
7	0.35	153	0.592	37.6
8	0.36	155	0.600	38.2
9	0.34	153	0.583	37.0
10	0.34	152	0.583	37.0
11	0.32	152	0.566	35.9
12	0.18	151	0.424	26.9
B1	0.33	152	0.574	36.5
2	0.35	153	0.592	37.6
3	0.39	155	0.624	39.7
4	0.43	153	0.656	41.7
5	0.43	154	0.656	41.7
6	0.43	156	0.656	41.8
7	0.39	156	0.624	39.8
8	0.35	154	0.592	37.6
9	0.27	154	0.520	33.0
10	0.27	154	0.520	33.0
11	0.20	155	0.447	28.5
12	0.17	152	0.412	26.2
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		154.04	0.57	36.00

Act Volumetric Flow Rate (acfm)	61078
Std. Volumetric Flow Rate (scfm)	52237
Dry Volumetric Flow Rate (dscfm)	37575

Method 2 Velocity Traverse

Run Number	3
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #4
Condition	Normal
Static Pressure (Ps)	-0.28
Location Height (ft)	100
Barometric Pressure	29.87

Date	2/10/2016
Operator	LB
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	29.77
Abs. Stack Press. (in. Hg)	29.75

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	5.99	15.11	
Replicate 2			
Replicate 3			
Average	6.0	15.1	78.9

Moisture By: Saturation

Saturated Percent Moisture	23.62
Calculated Percent Moisture	23.62
Mole Frac of Dry Stack Gas	0.764
Average MW of Dry Gas	29.56
Average MW of Wet Gas	26.83

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.32	145	0.566	35.4
2	0.37	144	0.608	38.0
3	0.35	144	0.592	37.0
4	0.33	146	0.574	35.9
5	0.32	147	0.566	35.4
6	0.30	148	0.548	34.3
7	0.34	149	0.583	36.6
8	0.37	151	0.608	38.2
9	0.42	150	0.648	40.7
10	0.36	151	0.600	37.7
11	0.32	151	0.566	35.5
12	0.18	148	0.424	26.6
B1	0.41	150	0.640	40.2
2	0.42	148	0.648	40.6
3	0.44	147	0.663	41.5
4	0.42	148	0.648	40.6
5	0.40	146	0.632	39.6
6	0.40	145	0.632	39.5
7	0.35	145	0.592	37.0
8	0.33	146	0.574	35.9
9	0.31	147	0.557	34.9
10	0.26	148	0.510	32.0
11	0.24	149	0.490	30.7
12	0.20	149	0.447	28.1
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		147.58	0.58	36.33

Act Volumetric Flow Rate (acfm)	61633
Std. Volumetric Flow Rate (scfm)	53255
Dry Volumetric Flow Rate (dscfm)	40677

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METHOD 30B

Run No. 1

Date	2/10/2016		Sorbent Trap Number	OL328484	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #4		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	25	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	29.79	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:25:00	0.000		0.75	153	303	43	41		-4
	5	12:30	5.75		0.75	151	273	42	43		-1
	10	12:35	9.38		0.75	148	265	42	40		-1
	15	12:40	12.90		0.75	153	236	41	40		-1
	20	12:45	16.42		0.75	153	236	42	40		-1
	25	12:50	19.88		0.75	150	274	44	41		-1
	30	12:55	23.05		0.75	151	275	44	41		-1
	35	13:00	24.58		0.75	153	268	48	43		-1
	40	13:05	32.78		0.75	152	246	44	42		-1
	45	13:10	36.42		0.75	147	248	46	42		-1
	50	13:15	40.10		0.75	150	236	54	44		-1
	55	13:20	43.55		0.75	152	273	48	44		-1
	60	13:25	46.931		0.75	154	303	50	44		-1
TOTAL			46.931	46.9310	0.75	151	264	45	42		-1
Target Volume											
Spike Amount (ng)	2000										

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**49907.00114**	**49.9070011**

AECOM

METHOD 30B

Date	2/10/2016		Sorbent Trap Number	OL304707	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #4		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	25	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	7	Barometric Pres. (" Hg)	29.79	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:25:00	0.000		0.75	153	303	42	41		-4
	5	12:30	5.80		0.75	151	273	42	43		-1
	10	12:35	9.80		0.75	148	265	42	40		-1
	15	12:40	13.35		0.75	153	236	43	40		-1
	20	12:45	16.79		0.75	153	236	43	40		-1
	25	12:50	20.30		0.75	150	274	46	41		-1
	30	12:55	23.39		0.75	151	275	45	41		-1
	35	13:00	27.65		0.75	153	268	45	43		-1
	40	13:05	32.80		0.75	152	246	46	42		-1
	45	13:10	33.89		0.75	147	248	45	42		-1
	50	13:15	37.54		0.75	150	236	55	44		-1
	55	13:20	41.10		0.75	152	273	49	44		-1
	60	13:25	44.586		0.75	154	303	48	44		-1
TOTAL			44.586	44.586	0.75	151	264	45	42		-1.23
Target Volume											
Spike Amount (ng)											

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**47391.63862**	**47.3916386**

AECOM

METHOD 30B

Date	2/10/2016		Sorbent Trap Number	OL328302	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #4		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	12	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	8	Barometric Pres. (" Hg)	29.78	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	13:45:00	0.000		0.75	150	255	48	44		-1
	5	13:50	3.45		0.75	152	291	47	45		-1
	10	13:55	6.25		0.75	152	291	48	44		-1
	15	14:00	10.20		0.75	150	260	54	46		-1
	20	14:05	14.15		0.75	152	235	50	46		-1
	25	14:10	17.88		0.75	154	238	49	45		-1
	30	14:15	21.23		0.75	154	271	48	44		-1
	35	14:20	25.35		0.75	148	301	40	44		-1
	40	14:25	28.50		0.75	150	286	48	50		-1
	45	14:30	32.40		0.75	146	260	49	46		-1
	50	14:35	35.85		0.75	156	276	46	48		-1
	55	14:40	39.56		0.75	152	255	49	46		-1
	60	14:45	43.049		0.75	146	265	52	46		-1
TOTAL			43.0490	43.0490	0.75	151	268.00	48.31	45.69		-1.00
Target Volume											
Spike Amount (ng)	2000										

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**45486.26901**	**45.486269**

AECOM

METHOD 30B

Run No. 2

Date	2/10/2016		Sorbent Trap Number	OL321049	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #4		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM/FC		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	12	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	8	Barometric Pres. (" Hg)	29.78	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
A1	0	13:45:00	0.000		0.75	150	255	50	44		-1
	5	13:50	3.780		0.75	152	291	49	45		-1
	10	13:55	6.800		0.75	152	291	49	44		-1
	15	14:00	10.780		0.75	150	260	52	46		-1
	20	14:05	14.730		0.75	152	235	52	46		-1
	25	14:10	18.460		0.75	154	238	50	45		-1
	30	14:15	21.780		0.75	154	271	49	44		-1
	35	14:20	25.460		0.75	148	301	49	44		-1
	40	14:25	29.000		0.75	150	286	49	50		-1
	45	14:30	32.660		0.75	146	260	49	46		-1
	50	14:35	35.980		0.75	156	276	49	48		-1
	55	14:40	39.630		0.75	152	255	50	46		-1
	60	14:45	43.2890		0.75	146	265	50	46		-1
TOTAL			43.2890	43.2890	0.75	150.9230769	268.00	49.77	45.69		-1.00
Target Volume											
Spike Amount (ng)											

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**45608.63307**	**45.6086331**

AECOM

METHOD 30B

Run No. 3

Date	2/10/2016		Sorbent Trap Number	OL304654	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0220	
Location	Calciner #4		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0220	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	8	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	29.77	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	15:05:00	0.000		0.75	150	256	50	47		-1
	5	15:10	4.00		0.75	154	251	51	46		-1
	10	15:15	7.29		0.75	149	241	51	46		-1
	15	15:20	10.97		0.75	153	241	52	46		-1
	20	15:25	14.75		0.75	155	242	52	46		-1
	25	15:30	18.23		0.75	150	251	51	47		-1
	30	15:35	21.83		0.75	151	252	52	46		-1
	35	15:40	25.82		0.75	156	251	51	46		-1
	40	15:45	28.75		0.75	149	281	51	45		-1
	45	15:50	32.37		0.75	155	304	52	45		-1
	50	15:55	35.91		0.75	152	303	53	46		-1
	55	16:00	39.43		0.75	153	300	50	45		-1
	60	16:05	43.472		0.75	156	297	51	45		-1
TOTAL			43.4720	43.4720	0.75	152.5384615	266.92	51.31	45.85		-1.00
Target Volume											
Spike Amount (ng)	2000										

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**45648.2056**	**45.6482056**

AECOM

METHOD 30B

Run No. 3

Date	2/10/2016		Sorbent Trap Number	OL321104	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.022	
Location	Calciner #4		Nozzle ID (inches)		DGM Cal Factor (Y)	1.022	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	LB		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	8	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)			Barometric Pres. (" Hg)	29.77	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	15:05:00	0.000		0.75	150	256	57	47		-1
	5	15:10	4.050		0.75	154	251	52	46		-1
	10	15:15	7.710		0.75	149	241	51	46		-1
	15	15:20	11.490		0.75	153	241	51	46		-1
	20	15:25	15.400		0.75	155	242	52	46		-1
	25	15:30	19.000		0.75	150	251	51	47		-1
	30	15:35	22.100		0.75	151	252	51	46		-1
	35	15:40	25.760		0.75	156	251	52	46		-1
	40	15:45	28.830		0.75	149	281	51	45		-1
	45	15:50	32.590		0.75	155	304	51	45		-1
	50	15:55	36.100		0.75	152	303	51	46		-1
	55	16:00	39.620		0.75	153	300	50	45		-1
	60	16:05	43.3900		0.75	156	297	50	45		-1
TOTAL			43.3900	43.3900	0.75	152.5384615	266.92	51.54	45.85		-1.00
Target Volume											
Spike Amount (ng)											

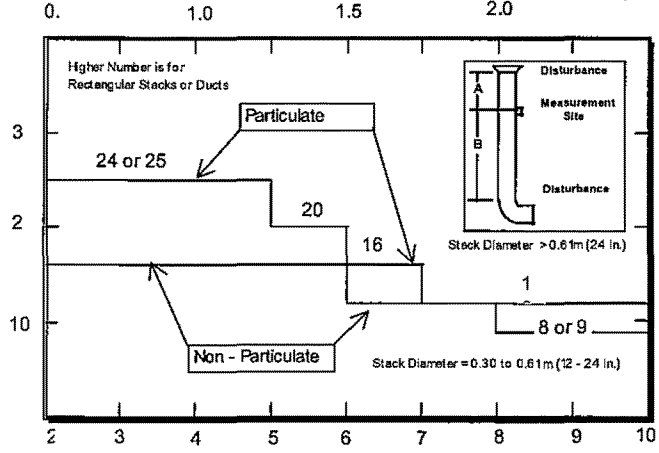
Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**45541.53309**	**45.5415331**

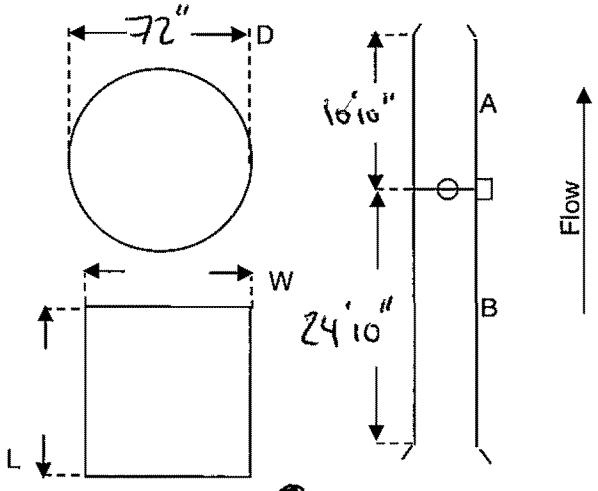
AECOM	FIELD SAMPLING DATA SHEET Sample and Velocity Traverse for Stationary Sources	EPA METHOD 1

Client/Plant: PCS	Project #: 62402248	Location: Calciner #4	Date: 2/3/14
Number of Traverse Points Chosen: 24	Number of Ports: 2	Number of Points per Port: 12	

Duct Diameters From Downstream Flow Disturbance (A/D)



Duct Diameters From Upstream Flow Disturbance (B/D)



Deq = 2LW / (L+W) _____
Dnstream Diameters (A/D) _____
Upstream Diameters (B/D) _____

Cross-Sectional Layout of Rectangular Stacks

Traverse Points	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5

Traverse Point	Fraction of Diameter	Distance From Wall	Nipple Length	Point Location
1	2.1	1.5	5"	6.5
2	6.7	4.8		9.8
3	11.8	8.5		13.5
4	17.7	12.8		17.8
5	25.0	18.0		23.0
6	35.6	25.6		30.6
7	64.4	46.4		51.4
8	75.0	54.0		59.0
9	82.3	59.3		64.3
10	88.2	63.5		68.5
11	93.3	67.2		72.2
12	97.9	70.5		75.5

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

LOCATION OF TRAVERSE POINT IN RECTANGULAR STACKS.

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

AECOM

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60490248.10	Date: 01/1/16	Operator(s): WL/BM
Location: Cal #4	Condition:	Moisture Run #: 1	Duration (min):
DGM#: W-55	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
P_{bar} ("Hg):	Height w.r.t. Barometer (ft):	P_{static} ("H_2O):	-.26
Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Duct Diameter ("): 72"
			Duct Length ("):
			Pitot Tube ID#: RTP-8-3
O_2 (%/time)	% (:)	% (:)	% (:)
CO_2 (%/time)	% (:)	% (:)	% (:)

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #:		Flow Run #:		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		11:30	12:00	:	:	:	:	
						ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					A1	.42	153					18
					2	.35	156					20
					3	.33	155					10
					4	.35	156					9
					5	.30	156					10
					6	.36	153					8
					7	.26	147					10
					8	.33	151					8
					9	.35	153					8
					10	.34	150					8
					11	.36	147					15
					12	.31	150					10
					B1	.35	148					0
					2	.37	149					10
					3	.38	152					12
					4	.34	154					12
					5	.37	155					10
					6	.36	155					6
					7	.31	155					6
					8	.32	155					2
					9	.29	156					2
					10	.32	151					0
					11	.32	150					18
					12	.34	150					22

Comments:

Preliminary Flows and Cyclonic Check

Test Run 4 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-11-2016 08:18:08	-0.140	-0.168
02-11-2016 08:19:08	-0.161	-0.170
02-11-2016 08:20:08	-0.161	-0.169
02-11-2016 08:21:08	-0.165	-0.170
02-11-2016 08:22:08	-0.167	-0.169
Pause		
End Pause		
02-11-2016 08:25:08	19.276*	20.576
02-11-2016 08:26:08	19.282*	20.561
02-11-2016 08:27:08	19.279*	20.551
02-11-2016 08:28:07	19.279*	20.557
02-11-2016 08:29:07	19.279*	20.566
02-11-2016 08:30:07	19.290*	20.553
Pause		
End Pause		
02-11-2016 08:33:08	10.022	9.789
02-11-2016 08:34:08	10.011	9.771
02-11-2016 08:35:08	10.012	9.767
02-11-2016 08:36:08	10.010	9.774
02-11-2016 08:37:08	10.006	9.765
Pause		
End Pause		
02-11-2016 08:41:08	20.766*	5.203
02-11-2016 08:42:08	20.783*	5.214
02-11-2016 08:43:08	20.818*	5.181
02-11-2016 08:44:08	20.802*	5.227
02-11-2016 08:45:08	20.801*	5.095
Pause		
End Pause		
02-11-2016 08:48:08	15.286	-0.140
02-11-2016 08:49:08	15.281	-0.141
02-11-2016 08:50:08	15.282	-0.138
02-11-2016 08:51:08	15.289	-0.138
02-11-2016 08:52:08	15.288	-0.139
02-11-2016 08:53:08	15.284	-0.138
02-11-2016 08:54:08	15.289	-0.142
02-11-2016 08:55:08	15.290	-0.141
Pause		
End Pause		
02-11-2016 08:57:08	20.780*	5.643
02-11-2016 08:58:08	20.813*	5.993
02-11-2016 08:59:08	20.815*	5.986
02-11-2016 09:00:08	20.819*	5.992
02-11-2016 09:01:07	20.818*	6.006
02-11-2016 09:02:07	20.826*	6.016
Pause		
End Pause		
02-11-2016 09:05:08	15.113	-0.097
02-11-2016 09:06:08	15.104	-0.130
02-11-2016 09:07:08	15.106	-0.128
02-11-2016 09:08:08	15.112	-0.117
02-11-2016 09:09:08	15.107	-0.117
02-11-2016 09:10:07	15.103	-0.115
02-11-2016 09:11:07	15.104	-0.123
Pause		
End Pause		
02-11-2016 09:14:08	20.796*	5.108
02-11-2016 09:15:08	20.796*	5.220
02-11-2016 09:16:08	20.792*	5.213
02-11-2016 09:17:08	20.803*	5.213
02-11-2016 09:18:08	20.806*	5.202
02-11-2016 09:19:08	20.801*	5.184
Pause		
End Pause		
02-11-2016 09:22:08	15.133	-0.110
02-11-2016 09:23:07	15.119	-0.119
02-11-2016 09:24:07	15.125	-0.110
02-11-2016 09:25:07	15.116	-0.107
02-11-2016 09:26:08	15.120	-0.117
Run Averages	O2 %	CO2 %
02-11-2016 09:26:53	15.422*	5.120

Operator: Lance Burleson
Plant Name: PCS Aurora
Location: Calciner #4
Test Run 4 End

17cv1906 Sierra Club v. EPA - 6/22 Production

ED_001523_00007569-00367

AECOM

FIELD SAMPLING DATA SHEET

Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 02-03-16	Operator(s): DM/RLM
Location: Calciner #4	Condition: Normal	Run #: 1	Duration (min): 72
Console#: N-55	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 3.17	P_{bar} ("Hg): 30.1	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.0	Vac. ("Hg): 12	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0.0	Vac. ("Hg): 7	Duct Width ("): --		Duct Length ("): --
Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P: ✓	-P: ✓	Nozzle D1 (") Ø: .264
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D2 (") ⊘: .273
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D3 (") ⊖: .269
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Average Nozzle D ("): .269

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B1	1002	0	859.691	.30	1.0	144	254	257	66	69	82	82	4
2		3	861.3	.27	.94	157	255	257	64	69	84	82	3
3		6	862.9	.27	.94	154	255	258	64	68	85	82	4
4		9	864.5	.38	1.3	154	256	258	60	67	86	83	4
5		12	866.2	.25	.86	153	259	258	57	68	87	83	3
6		15	867.8	.27	.94	150	259	257	56	69	88	83	3
7		18	869.4	.23	.80	152	255	258	56	68	88	84	3
8		21	870.9	.27	.80	153	256	257	56	69	89	84	3
9		24	872.3	.30	1.0	151	254	258	55	68	89	84	3
10		27	874.0	.32	1.1	151	254	258	54	68	90	85	3
11		30	875.6	.35	1.2	146	256	260	54	69	90	85	3
12		33	877.3	.36	1.2	154	256	257	54	70	90	85	3
STOP		36	879.122										
A1	1043	36	879.275	.30	1.0	152	260	255	59	70	88	85	3
2		39	880.8	.28	.97	145	257	260	57	68	89	85	3
3		42	882.4	.28	.97	152	256	258	56	68	89	85	3
4		45	884.1	.27	.94	146	256	258	56	69	89	85	3
5		48	885.7	.28	.97	156	258	258	57	70	89	85	3
6		51	887.3	.26	.90	153	257	260	57	71	89	85	3
7		54	888.9	.29	1.0	151	256	262	58	73	89	85	3
8		57	890.6	.27	.94	145	257	258	58	75	89	85	3
9		60	892.1	.27	.94	153	256	260	58	75	89	85	3
10		63	893.8	.27	.94	152	258	258	59	77	89	85	3
11		66	895.4	.27	.94	155	257	259	60	79	89	85	3
12		69	896.9	.25	.87	155	257	257	61	80	89	85	3
END	1119	72	898.529										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60422248.10	Date: 2-2-16
Location: Cal #4	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	485.3	766.5	
2	MT	0	MGS	547.5	547.3	
3	Water	100	MGS	707.2	713.0	
4	Silica Gel	350	MGS	888.9	901.4	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14110	Tare Wt. (g)	0.37561
	ID#:		Tare Wt. (g)	
	ID#:		Tare Wt. (g)	

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET
Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 2-3-16	Operator(s): DM/RLM
Location: Calciner #4	Condition: Normal (w/wash)	Run #: 2	Duration (min): 72
Console#: N-55	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 3.47 (3.3)	P_{bar} ("Hg): 30.10	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 12	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0	Vac. ("Hg): 8	Duct Width ("): --	Duct Length ("): --
Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P: ✓	-P: ✓	Nozzle D1 (") Ø: .264
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D2 (") ⊘: .273
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D3 (") ⊖: .269
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Average Nozzle D ("): .269

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B1	1230	0	901.267	.28	.98	157	254	257	66	72	85	83	3
2		3	902.85	.30	1.0	154	253	254	64	70	87	83	3
3		6	904.5	.26	.90	150	254	257	61	69	87	83	3
4		9	906.1	~~.28~~ .30	~~1.0~~	145	256	258	60	70	88	83	3
5		12	907.8	.24	.83	152	258	261	60	70	88	84	3
6		15	909.25	.25	.87	151	257	257	59	68	88	84	3
7		18	910.7	.37	1.2	154	254	259	59	71	89	84	3
8		21	912.45	.32	1.1	146	257	256	60	72	89	84	3
9		24	914.1	.37	1.2	152	257	258	60	73	89	84	3
10		27	915.85	.27	.89	146	255	259	61	75	89	84	3
11		30	917.5	.29	.96	148	256	255	62	76	89	84	3
12		33	919.0	.27	.89	148	256	249	62	77	89	84	3
STOP		36	920.614	→ PORT CHANGE →									
B1	1343	36	920.660	.29	.96	150	257	258		79	85	84	3
2		39	922.3	.27	.89	151	256	257	68	80	85	84	4
3		42	923.9	.29	.96	154	255	254	66	83	85	84	4
4		45	925.4	.27	.89	150	257	258	65	82	87	84	4
5		48	927.0	.28	.98	155	257	258	65	81	87	83	4
6		51	928.65	.25	.83	154	256	257	65	81	87	84	4
7		54	930.2	.29	.96	145	256	255	64	81	88	84	4
8		57	931.8	.27	.89	149	256	258	64	82	88	84	4
9		60	933.4	.26	.86	153	255	257	64	82	88	84	4
10		63	934.95	.30	.99	154	257	257	64	83	88	84	4
11		66	936.5	.27	.89	155	255	259	64	83	88	84	4
12		69	938.15	.27	.89	151	255	256	64	84	87	83	4
END	1419	72	939.712										

COMMENTS 1230-B01 wash cycle

Process paused during part change - resumed 1343

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60402248.10	Date: 2-3-16
Location: Cal #4	Condition: Normal	Run #: 2

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	503.1	769.2	
2	MT	0	MGS	594.1	594.3	
3	Water	100	MGS	691.0	703.7	
4	Silica Gel	350	MGS	901.8	916.5	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14118	Tare Wt. (g)	0.37534
	ID#:		Tare Wt. (g)	
	ID#:		Tare Wt. (g)	

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60702248.10	Date: 2-9-16	Operator(s): DW/WL
Location: Calciner #4	Condition: Normal	Run #: 3	Duration (min): 72
Console#: N-55	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 3.3	P_{bar} ("Hg): 29.6	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: Ø	Vac. ("Hg): 12	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: Ø	Vac. ("Hg): 8	Duct Width ("): --	Duct Length ("): --

Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P: ✓	-P: ✓	Nozzle D1 (") Ø: 0.264
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D2 (") ⊘: 0.273
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D3 (") ⊖: 0.269
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Average Nozzle D ("): 0.269

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	9:37	0	940.193	.31	1.0	149	255	264	40	69	48	47	1
2		3	942.2	.33	1.1	144	255	257	39	68	48	47	1
3		6	943.85	.31	1.0	148	256	257	38	67	50	47	1
4		9	945.45	.28	.93	145	256	260	42	66	51	48	1
5		12	946.95	.29	.96	142	254	252	41	67	52	47	1
6		15	948.6	.27	.89	149	257	258	41	67	52	48	1
7		18	950.1	.31	1.0	147	253	257	42	66	53	48	1
8		21	951.85	.30	.99	148	253	259	42	67	52	48	1
9		24	953.35	.30	.99	142	256	256	42	66	53	48	1
10		27	955.15	.27	.89	145	256	258	43	65	53	48	1
11		30	956.5	.31	1.0	143	256	255	43	65	53	48	1
12		33	958.1	.30	.99	150	257	257	43	66	53	48	1
STOP	1017	36	959.745			PORT CHANGE							
B1	1023	36	960.296	.42	1.4	139	258	254	45	66	52	49	3
2		39	961.95	.45	1.5	141	246	260	55	67	53	49	3
3		42	963.9	.39	1.3	147	240	256	47	67	54	49	3
4		45	965.6	.43	1.4	144	243	254	44	73	55	49	4
5		48	967.4	.40	1.3	147	241	257	39	73	56	50	5
6		51	969.2	.38	1.3	145	240	256	39	73	56	50	5
7		54	970.95	.32	1.1	144	239	255	40	72	56	50	5
8		57	972.6	.27	.89	146	239	257	39	72	55	50	4
9		60	974.2	.26	.86	139	241	259	39	70	55	50	3
10		63	975.7	.25	.83	146	241	257	39	69	55	50	3
11		66	977.15	.26	.86	145	241	255	40	68	55	50	3
12		69	978.65	.26	.86	145	239	256	39	67	55	51	3
END	1059	72	980.176										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: RCS	Project #: 60402248.10	Date: 2-9-16
Location: Cal #4	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	~~487.1~~ 502.7	687.9	
2	MT	0	MGS	~~654.6~~ 592.5	620.6	
3	Water	100	MGS	~~613.0~~ 702.0	710.5	
4	Silica Gel	350	MGS	~~911.4~~ 925.1	939.4	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14117	Tare Wt. (g)	0.37506
	ID#:		Tare Wt. (g)	
	ID#:		Tare Wt. (g)	

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM	FIELD SAMPLING DATA SHEET (MOISTURE RECOVERY)	EPA METHOD 4

Client/Plant:	Project #:	Date:
Location:	Condition:	Moisture Run #:

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	H_2O	100	MOD			
2	H_2O	100	GS			
3	--	Empty	MOD			
4	Silica Gel	--	MOD			
5						
Sum						

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 02/11/16	Operator(s): WL/BM
Location: Cal. #4	Condition: Normal	Run #: 1	Duration (min): 72
DGM#: N-55	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 2.32	P_{bar} ("Hg):	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 12	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 8	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓			Nozzle D1 (") Ø: 0.241
Probe & Pitot ID: RTP-6-4					Nozzle D2 (") ⊘: 0.240
					Nozzle D3 (") ⊖: 0.240
					Average Nozzle D ("): 0.240

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
Post												
A1	1250	0	757.610	.31	.71	130			64	78	79	1
2		3	758.64	.29	.67	148			61	78	78	1
3		6	759.38	.32	.74	149			60	78	79	1
4		9	760.77	.35	.81	152			59	79	79	1
5		12	762.22	.30	.69	153			59	80	79	1
6		15	763.58	.30	.69	153			58	81	79	1
7		18	764.95	.27	.62	155			58	81	79	1
8		21	766.32	.27	.62	152			58	81	79	1
9		24	767.64	.29	.67	152			58	81	79	1
10		27	768.99	.29	.67	147			57	83	79	2
11		30	770.31	.30	.69	152			55	83	80	2
12		33	771.68	.31	.71	153			56	83	80	2
	1326	36	773.089			Port Change						
B1	1329		773.087	.37	.85	152			60	83	80	3
2		39	774.62	.36	.83	154			58	83	80	3
3		42	776.13	.36	.83	155			58	84	80	3
4		45	777.63	.33	.76	152			61	84	80	3
5		48	779.07	.39	.90	154			60	85	81	4
6		51	780.58	.32	.74	155			58	85	81	4
7		54	782.02	.31	.71	150			58	86	81	4
8		57	783.43	.27	.62	151			59	86	81	3
9		60	784.76	.37	.85	153			59	87	81	4
10		63	786.27	.32	.74	152			59	87	81	4
11		66	787.73	.30	.69	153			60	88	82	4
12		69	789.09	.28	.64	150			60	88	82	4
	1405	72	790.429									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-1-16
Location: Cal #4	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	616.3	847.7	
2	DI H_2O	100	GS	714.4	741.3	
3	Empty	--	MOD	656.1	659.2	
4	Silica Gel	--	MOD	929.2	937.5	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM — FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60470648.10	Date: 02/1/16	Operator(s): WL/BW
Location: Cal. #4	Condition: Normal	Run #: 2	Duration (min): 72
DGM#: N-55	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 2.32	P_{bar} ("Hg):	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): −.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 12	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 8	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓		- P ("H_2O): ✓		Nozzle D1 (") Ø: 0.241
Probe & Pitot ID:					Nozzle D2 (") ⊘: 0.240
					Nozzle D3 (") ⊖: 0.240
					Average Nozzle D ("): 0.240

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
Port												
B1	1429	0	790.819	.35	.81	156	80		65	84	83	1
2		3	792.34	.38	.88	157			57	85	83	1
3		6	793.87	.39	.90	156			56	86	83	1
4		9	795.45	.33	.76	145			56	87	83	1
5		12	796.87	.32	.74	147			56	87	84	1
6		15	798.31	.32	.74	152			57	88	84	1
7		18	799.74	.35	.81	154			57	88	84	1
8		21	801.21	.29	.67	156			58	89	84	1
9		24	802.58	.41	.95	155			58	89	84	2
10		27	804.21	.32	.74	154			58	89	84	2
11		30	805.59	.30	.69	156			58	89	84	2
12		33	806.97	.28	.64	154			59	89	84	2
	1505	36	808.316		—	Port		Change				
A1	1508		808.316	.33	.76	155			58	88	84	2
top → 2	1510	39	809.130									
run start → 3	1635	42	809.130	.32	.74	149			58	82	83	2
4		45	811.17	.28	.64	155			54	82	83	2
5		48	812.46	.29	.67	154			54	82	83	2
6		51	813.85	.30	.69	148			54	83	83	2
7		54	815.23	.31	.71	145			55	84	83	2
8		57	816.63	.29	.67	153			56	85	83	2
9		60	818.01	.29	.67	148			57	86	83	2
10		63	819.37	.27	.62	152			57	86	83	2
11		66	820.80	.26	.60	153			57	86	83	2
12		69	822.02	.28	.64	154			57	86	83	2
		72	823.38	.28	.64	152			57	86	83	2
	1709	72	824.715									

COMMENTS

Stop Run 1510 Started back At 1635

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 2-1-16
Location: Cal #4	Condition: Normal	Run #: 2

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	767.5	996.2	
2	DI H_2O	100	GS	673.0	691.6	
3	Empty	--	MOD	642.0	644.5	
4	Silica Gel	--	MOD	907.0	914.2	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM	FIELD SAMPLING DATA SHEET	EPA Method 13A/B
		PAGE 1 OF 1

Client/Plant: PCS	Project #: 60407148.10	Date: 02/11/16	Operator(s): WL/BM
Location: Col. #4	Condition: Normal	Run #: 3	Duration (min): 72
DGM#: N-55	CF (Yd): 1.0189	$\Delta H_@$: 1.8639	Cp: 0.84
K-Factor: 2.32	P_{bar} ("Hg):	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.26

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 12	Source Height (ft): 100	Duct Diameter ("): 12
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 8	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: 0.241	
Probe & Pitot ID:			Nozzle D2 (") ⊘: 0.240	
			Nozzle D3 (") ⊖: 0.240	
			Average Nozzle D ("): 0.240	

Sample Point Port	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	1725	0	824.965	.29	.67	152			63	83	83	1
2		3	826.35	.31	.71	151			61	83	83	1
3		6	827.76	.33	.76	155			60	84	82	1
4		9	829.27	.32	.74	156			59	84	82	1
5		12	830.61	.34	.78	156			59	85	82	1
6		15	832.05	.33	.76	152			61	85	82	1
7		18	833.48	.33	.76	153			60	85	82	1
8		21	834.93	.29	.67	154			60	85	82	1
9		24	836.28	.31	.71	141			60	86	82	1
10		27	837.71	.33	.76	152			58	86	82	1
11		30	839.14	.32	.74	153			58	86	82	1
12		33	840.57	.28	.64	154			58	86	82	1
	1801	36	841.928		—	Post	Charge					
B1	1803		841.925	.42	.97	154			56	85	81	2
2		39	843.57	.36	.83	154			55	85	81	2
3		42	845.08	.35	.81	153			55	85	81	2
4		45	846.49	.33	.76	153			55	85	81	2
5		48	847.96	.34	.78	150			56	85	81	2
6		51	849.42	.34	.78	148			56	85	81	2
7		54	850.00	.32	.74	151			57	85	81	2
8		57	852.34	.33	.76	152			57	85	81	2
9		60	853.77	.33	.76	155			57	85	81	2
10		63	855.22	.31	.71	156			54	85	81	2
11		66	856.62	.30	.69	156			57	85	81	2
12		69	857.97	.29	.67	154			57	85	81	2
	1839	72	859.331									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 7-1-6
Location: Cal #4	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	635.6	864.1	
2	DI H_2O	100	GS	723.9	738.6	
3	Empty	--	MOD	656.6	658.4	
4	Silica Gel	--	MOD	871.7	881.3	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

FIELD SAMPLING DATA SHEET
Flow and Moisture

AECOM

EPA Methods 2 & 4

PAGE 1 OF 1

Client/Plant: TCS	Project #: 60470222	Date: 2-10-16	Operator(s): LB
Location: Calcher #4	Condition: Normal	Moisture Run #:	Duration (min):
DGM#:	CF (Yd):	$\Delta H_@$:	Cp: 0.84

P_{bar} ("Hg): 29.88	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): 0.28

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O):		- P ("H_2O):	Pitot Tube ID#:
Fyrite/Orsat O_2 (%/time)	% (:)		% (:)	% (:)
Fyrite/Orsat CO_2 (%/time)	% (:)		% (:)	% (:)

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #: 2		Flow Run #: 3		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
~~1307~~					A1	0.26	154	~~0.19~~	0.24	0.32	145	
						0.33	148	155	0.28	0.37	144	
						0.35	147	157	0.32	0.35	144	
						0.34	147	156	0.35	0.33	146	
						0.35	148	157	0.36	0.32	147	
						0.33	146	154	0.35	0.30	148	
						0.36	150	153	0.35	0.34	149	
						0.34	151	155	0.36	0.37	151	
						0.37	150	153	0.34	0.42	150	
						0.32	151	152	0.34	0.36	151	
						0.33	151	152	0.32	0.32	151	
						0.14	151	151	0.18	0.18	148	
					B1	0.32	154	~~0.18~~ 152	0.33	0.41	150	
						0.37	153	153	0.35	0.42	148	
						0.41	153	155	0.39	0.44	147	
						0.42	153	153	0.43	0.42	148	
						0.43	157	154	0.43	0.40	146	
						0.43	157	156	0.43	0.40	145	
						0.38	156	156	0.39	0.35	145	
						0.32	156	154	0.35	0.33	146	
						0.28	155	154	0.27	0.31	147	
						0.27	155	154	0.27	0.26	148	
						0.21	153	155	0.20	0.24	149	
						0.16	153	152	0.17	0.20	149	

Comments:

Flows during Hg on Calcher #4

AECOM

Plant Name	PCS	Date	2/10/16	Page	1 of 1
Project Number	60462248.10	Condition	Normal	Initial Leak Rate	1) 0 @ 25 "Hg; 2) 0 @ 25 "Hg
Location (Source)	Calciner 4	Run	1		
Meter ID & Cal Factors	Y0021663	Operator	LB	Final Leak Rate	1) 0 @ 7 "Hg; 2) 0 @ 7 "Hg
Sorbent Trap IDs	1) OL328484	Bar. Press. (in. H_2O)	29.98		
	2) OL304707	Elevation (relative to Barometer) (ft)	160	Third Bed Spike Level	1) 2000 Ng; 2) 0 Ng

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1225	0	0.75	170	303	41		43	-4
2)		0	0.75	153				42	-4
1)	1230	5.75	0.75	151	273	43		42	-1
2)		5.80	0.75					42	-1
1)	1235	9.38	0.75	148	265	40		42	-1
2)		9.80	0.75					42	-1
1)	1240	12.90	0.75	153	236	40		41	-1
2)		13.35	0.75					43	-1
1)	1245	16.42	0.75	153	236	40		42	-1
2)		16.79	0.75					43	-1
1)	1250	19.88	0.75	150	274	41		44	-1
2)		20.30	0.75					46	-1
1)	1255	23.05	0.75	151	275	41		44	-1
2)		23.39	0.75					45	-1
1)	1300	24.58	0.75	153	268	43		48	-1
2)		27.65	0.75					45	-1
1)	1305	32.78	0.75	152	246	42		44	-1
2)		32.86	0.75					46	-1
1)	1310	36.42	0.75	147	248	42		46	-1
2)		33.89	0.75					45	-1
1)	1315	40.10	0.75	150	236	44		54	-1
2)		37543	0.75					55	-1
1)	1320	43.55	0.75	152	273	44		48	-1
2)		41.10	0.75					49	-1
1)	1325	46.931	0.75	154	303	44		50	-1
2)		44.586	0.75					48	-1
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name	PCS	Date	2/10/16	Page	1 of 1
Project Number	60280228.40	Condition	Normal	Initial Leak Rate	1) 0 @ 12 "Hg; 2) 0 @ 12 "Hg
Location (Source)	Caldron 4	Run	2		
Meter ID & Cal Factors	4002944 / 4002663	Operator	LB	Final Leak Rate	1) 0 @ 8 "Hg; 2) 0 @ 8 "Hg
Sorbent Trap IDs	1) OL328302	Bar. Press. (in. H_2O)	29.88		
	2) OL321049	Elevation (relative to Barometer) (ft)	1800	Third Bed Spike Level	1) 2500 Ng; 2) 0 Ng

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	13:45	0	0.75	150	255	44		48	-1
2)		0	0.75					50	-1
1)	13:48	3.45	0.75	152	291	45		47	-1
2)	1355	3.76	0.75					49	-1
1)	1400	6.25	0.75	152	291	44		48	-1
2)		6.80	0.75					49	-1
1)	1405	10.20	0.75	150	260	46		54	-1
2)		10.78	0.75					52	-1
1)	1410	14.15	0.75	152	235	46		50	-1
2)		14.73	0.75					52	-1
1)	1415	17.88	0.75	154	238	45		49	-1
2)		18.46	0.75					50	-1
1)	1420	21.23	0.75	154	271	44		48	-1
2)		21.78	0.75					49	-1
1)	1425	25.35	0.75	148	301	44		47	-1
2)		25.96	0.75					49	-1
1)	1430	29.80	0.75	150	286	50		48	-1
2)		29.00	0.75					49	-1
1)	1435	32.40	0.75	146	260	46		49	-1
2)		32.66	0.75					49	-1
1)	1440	35.85	0.75	156	276	48		46	-1
2)		35.98	0.75					49	-1
1)	1445	39.56	0.75	152	255	46		49	-1
2)		39.63	0.75					50	-1
1)	1450	43.049	0.75	146	265	46		52	-1
2)		43.289	0.75					50	-1
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name	PCS	Date	2/10/16	Page	1 of 1
Project Number	60402248.10	Condition	Normal	Initial Leak Rate	1) 0 @ 8 "Hg
Location (Source)	Calciner 4	Run	3		2) 0 @ 8 "Hg
Meter ID & Cal Factors	4002424 / 4002663	Operator	LB	Final Leak Rate	1) @ "Hg
Sorbent Trap IDs	1) OL3041654	Bar. Press. (in. H_2O)	29.88		2) @ "Hg
	2) OL3211104	Elevation (relative to Barometer) (ft)	100	Third Bed Spike Level	1) 2,000 N_g
					2) 0 N_g

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1505	0	0.75	150	256	47		50	-1
2)		0	0.75					57	-1
1)	1510	4.00	0.75	154	251	46		51	-1
2)		4.05	0.75					52	-1
1)	1515	7.29	0.75	149	241	46		51	-1
2)		7.71	0.75					51	-1
1)	1520	10.97	0.75	153	241	46		52	-1
2)		11.49	0.75					51	-1
1)	1525	14.75	0.75	155	242	46		52	-1
2)		15.40	0.75					52	-1
1)	1530	18.23	0.75	150	251	47		51	-1
2)		19.00	0.75					51	-1
1)	1535	21.83	0.75	151	252	46		52	-1
2)		22.10	0.75					51	-1
1)	1540	25.82	0.75	156	251	46		51	-1
2)		25.76	0.75					52	-1
1)	1545	28.75	0.75	149	281	45		51	-1
2)		28.83	0.75					51	-1
1)	1550	32.37	0.75	155	304	45		52	-1
2)		32.59	0.75					51	-1
1)	1555	35.91	0.75	152	303	46		53	-1
2)		36.10	0.75					51	-1
1)	1600	39.43	0.75	153	300	45		50	-1
2)		39.62	0.75					50	-1
1)	1605	43.472	0.75	156	297	45		51	-1
2)		43.390	0.75					50	-1
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

A-5 Calciner No. 5

PCS Phosphate Operations - Stack Test Results

Green indicates hard entry

Test Information

Location	Calciner No. 5
Product	Single Float Calcined Rock
Source	WESP
Stack ID No	205
Start Date	1/26/2016
Pollutant	Particulate
Method	5/202

Production Data

Date	1/26/2016
Feed Rate, Wet, TPH (During Test)	67.2
Bulk Moisture of Rock (Lab Analyses)	12.30%
Rock Feed Rate Dry, TPH	59.0
Lbs. Coal/Ton of Dry Feed	46.67
Coal Feed, TPH	1.38
Process Weight Rate, TPH	60.3
Loss On Ignition	2.98%
Production Rate During Test, TPH Product	57.2

Test Parameters/Conditions

	Run 1	Run 2	Run 3	Average
Time of Start	14:45	16:50	20:00	N/A
Time of Finish	16:04	19:09	21:14	N/A

Stack Gas Flow Rate Calculations

Stack Flow Rate, DSCFM	35,675	37,653	35,630	36,319
Sample Volume (DSCF)	42.390	44.861	42.055	43.102

Condensable
Particulate Determination, Inorganic Fraction

	Run 1	Run 2	Run 3	Average
Net Sample Weight, mg	11.27	5.52	9.59	N/A

Condensable
Particulate Determination, Organic Fraction

Net Sample Weight, mg	11.40	1.38	1.54	N/A
Train Blank, mg		2.30		N/A
CPM, mg/DSCF	0.4876	0.1092	0.2171	0.2713

Particulate Determination, Filterable

Beaker Final Weight, mg	0.90	21.03	1.05	N/A
Final Filter Weight, mg	12.31	65.23	4.67	N/A
Net Sample Weight, mg	13.21	86.26	5.72	N/A
Mg Particulate/DSCF	0.3116	1.9228	0.1360	0.7902
Mg Particulate/DSCF, Averaged for Wash Cycle Procedures				0.3088
grams/DSCM	0.0110	0.0679	0.0048	0.0279

Total Particulate Determination

PM Emission Rate, Lbs./Hr - Filterable	1.47	9.58	0.64	3.90
PM Emission Rate, Lbs./Hr - Condensable-Inorganic	1.25	0.61	1.07	0.98
PM Emission Rate, Lbs./Hr - Condensable-Organic	1.27	0.15	0.17	0.53
PM Emission Rate, Lbs./Hr -Total Condensable (corrected with train blank)	2.30	0.54	1.02	1.29
PM Emission Rate, Lbs./Hr - Total Particulate	3.77	10.12	1.66	5.19
Average Daily PM Emission Rate, Lbs./Hr - Filterable				1.482
Average Daily PM Emission Rate, Lbs./Hr -Condensible				1.606
Average Daily PM Emission Rate, Lbs./Hr - Total Particulate				3.088
PM Emission Rate, Lbs./Day				74.114
PM Emission Rate, grams/dscm				0.0109
PM Emission Rate, grains/dscf				0.005
Allowable PM Rate, grain/dscf				0.080

Data For Avg Daily Emission Rate Calculation (inputs in red cells only)

Total PM lbs/hr

Total PM lbs/hr Run with wash (enter cell address) (E_s)	10.12
Ave Hrs washing per 24 Hrs (S)	0.43
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.43
Run Time During test not Washing in hours (B)	0.77
Total PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	2.72

Filterable PM lbs/hr

Filterable PM lbs/hr Run with wash (enter cell address) (E_s)	9.58
Ave Hrs washing per 24 Hrs (S)	0.4306
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.43
Run Time During test not Washing in hours (B)	0.77
Filterable PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.06

Condensible PM lbs/hr

Condensible PM lbs/hr Run with wash (enter cell address) (E_s)	0.54
Ave Hrs washing per 24 Hrs (S)	0.4306
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.43
Run Time During test not Washing in hours (B)	0.77
Condensible PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.66

PM Emission rate g/dscm

Filterable PM g/dscm Run with wash (enter cell address) (E_s)	0.07
Ave Hrs washing per 24 Hrs (S)	0.43
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.43
Run Time During test not Washing in hours (B)	0.77
Filterable PM g/dscm Avg of two non-wash runs (enter cell addresses)(E_N)	0.01

PM Emission rate mg/dscf

Filterable PM mg/dscf Run with wash (enter cell address) (E_s)	1.92
Ave Hrs washing per 24 Hrs (S)	0.43
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.43
Run Time During test not Washing in hours (B)	0.77
Filterable PM mg/dscf Avg of two non-wash runs (enter cell addresses)(E_N)	0.22

***Water Wash Performed on Run 2**

(R=24hrs)

$E_{avg} = E_s S (A+B)/AR) + E_N (((R-S)/R)-(BS/AR))$

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 5**
Condition	**Normal**
Sample Type:	**Method 5/202**

Run Number: / Date:	1 26-Jan-16	2 26-Jan-16	3 26-Jan-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	30.06	30.06	30.07	30.06
Absolute Stack Pressure (in H2O)	30.04	30.04	30.05	30.05
Stack Static Pressure (in H2O)	-0.22	-0.22	-0.22	-0.22
Average Stack Temperature (°F)	157.7	158.0	159.4	158.4
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	42.041	43.986	41.035	42.354
Average Meter Pressure (in H2O)	1.17	1.31	1.19	1.22
Average Meter Temperature (°F)	81.6	75.7	73.1	76.8
Moisture Collected (g)	407.6	405.5	435.4	416.2
Carbon Dioxide Concentration (%V)	7.7	7.7	7.7	7.7
Oxygen Concentration (%V)	13.5	13.5	13.5	13.5
Nitrogen Concentration (%V)	78.8	78.8	78.8	78.8
Dry Gas Meter Factor (γ_δ)	1.0266	1.0266	1.0266	1.0266
Nozzle Diameter (in)	0.280	0.280	0.280	0.280
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.589	0.623	0.584	0.599
Standard Metered Volume (dscf)	42.390	44.861	42.055	43.102
Standard Metered Volume (dscm)	1.200	1.270	1.191	1.221
Stack Moisture (%V)	31.2	29.9	32.8	31.3
Saturated Moisture (%V)	29.9	30.6	31.4	30.6
Mole Fraction Dry Stack Gas	0.701	0.701	0.686	0.696
Dry Molecular Weight	29.77	29.77	29.77	29.77
Wet Molecular Weight	26.25	26.25	26.08	26.19
Average SQRT of Delta P	0.55	0.58	0.56	0.56
Stack Gas Velocity (fps)	34.9	36.9	35.7	35.9
Stack Gas Velocity (mps)	10.7	11.2	10.9	10.9
Volumetric Flow Rate (acfm)	59289	62594	60627	60837
Volumetric Flow Rate (acmm)	1679	1773	1717	1723
Volumetric Flow Rate (dscfm)	35675	37653	35630	36319
Volumetric Flow Rate (dscmm)	1010	1066	1009	1029
Percent Isokinetic	109.2	109.5	108.5	109.0
Post Test Meter QA (γ_{qa})	0.9944	1.0008	1.0204	1.0052

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 5
Condition	Normal
Meter Box Number	N-44
Meter Factor (γ_d)	1.0266
Minutes per Point	3.0
Barometric Pressure	30.16

Date	1/26/2016
Operator	DM/LB
Run Number	1
K Factor	3.82
Meter $\Delta H_@$	1.9218
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.22
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.276
Nozzle ID 2 (in)	0.285
Nozzle ID 3 (in)	0.279
Nozzle ID (in)	0.280

O2/CO2 Method Based on Hg Runs

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.7	13.5	
Replicate 2			
Replicate 3			
Average	7.7	13.5	78.8

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	483.6	835.8	352.2
Impinger 2	544.8	573.4	28.6
Impinger 3	721.0	732.8	11.8
Impinger 4	895.8	910.8	15.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			407.6
Pitot Tube ID			6-4
Saturated Percent Moisture		29.90	Standard
Calculated Percent Moisture		31.19	Volume (dscf)
Isokinetic %		109.2	42.4

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	14:45:00	193.675	0.23	0.88	156	75	79
A2	3	14:48:00	195.300	0.22	0.84	152	78	80
A3	6	14:51:00	196.650	0.21	0.80	159	78	80
A4	9	14:54:00	198.550	0.25	0.96	157	78	82
A5	12	14:57:00	200.100	0.25	0.96	152	77	83
A6	15	15:00:00	201.600	0.25	0.96	152	78	85
A7	18	15:03:00	203.900	0.32	1.22	153	78	84
A8	21	15:06:00	205.300	0.30	1.15	157	78	86
A9	24	15:09:00	206.600	0.30	1.15	158	78	86
A10	27	15:12:00	208.100	0.33	1.26	156	78	86
A11	30	15:15:00	209.800	0.37	1.41	153	78	86
A12	33	15:18:00	211.900	0.34	1.30	162	78	86
STOP	36	15:21:00	213.441					
B1	36	15:28:00	213.441	0.36	1.40	158	80	85
B2	39	15:31:00	216.200	0.40	1.50	161	79	85
B3	42	15:34:00	217.950	0.36	1.40	159	79	86
B4	45	15:37:00	219.900	0.35	1.40	158	80	86
B5	48	15:40:00	221.900	0.35	1.30	162	79	86
B6	51	15:43:00	223.600	0.33	1.20	157	81	87
B7	54	15:46:00	225.400	0.34	1.30	158	78	86
B8	57	15:49:00	227.200	0.30	1.20	161	82	86
B9	60	15:52:00	229.100	0.31	1.20	160	80	86
B10	63	15:55:00	231.100	0.29	1.10	162	78	86
B11	66	15:58:00	232.800	0.30	1.20	162	78	86
B12	69	16:01:00	234.700	0.25	0.96	159	78	87
	72	16:04:00	235.716					

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 5
Condition	Normal
Meter Box Number	N-44
Meter Factor (γ_d)	1.0266
Minutes per Point	3.0
Barometric Pressure	30.16

Date	1/26/2016
Operator	DM/LB
Run Number	2
K Factor	3.82
Meter $\Delta H_@$	1.9218
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.22
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.276
Nozzle ID 2 (in)	0.285
Nozzle ID 3 (in)	0.279
Nozzle ID (in)	0.280

O2/CO2 Method Based on Hg Runs

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.7	13.5	
Replicate 2			
Replicate 3			
Average	7.7	13.5	78.8

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	501.4	867.8	366.4
Impinger 2	592.1	598.7	6.6
Impinger 3	696.4	706.5	10.1
Impinger 4	856.7	879.1	22.4
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			405.5
Pitot Tube ID			6-4
Saturated Percent Moisture		30.63	Standard
Calculated Percent Moisture		29.88	Volume (dscf)
Isokinetic %		109.5	44.9

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	16:50:00	235.990	0.40	1.50	162	76	78
B2	3	16:53:00	237.900	0.40	1.50	164	75	77
B3	6	16:56:00	239.600	0.39	1.50	159	77	78
B4	9	16:59:00	241.500	0.43	1.60	157	74	79
B5	12	17:02:00	243.600	0.36	1.40	154	74	81
B6	15	17:05:00	245.400	0.32	1.20	160	74	80
B7	18	17:08:00	247.100	0.34	1.30	161	76	80
B8	21	17:11:00	248.900	0.38	1.50	161	76	81
B9	24	17:14:00	250.800	0.39	1.50	161	74	81
B10	27	17:17:00	252.500	0.32	1.20	154	74	79
B11	30	17:20:00	254.100	0.28	1.10	159	74	78
B12	33	17:23:00	255.800	0.21	0.80	157	74	79
STOP	36	17:26:00	257.318					
A1	36	18:09:00	257.318	0.29	1.10	159	76	79
A2	39	18:12:00	258.700	0.28	1.10	161	74	80
A3	42	18:15:00	260.556	0.29	1.10	154	74	77
A4	45	18:18:00	262.100	0.28	1.10	151	73	77
A5	48	18:21:00	264.000	0.33	1.30	156	72	75
A6	51	18:24:00	265.800	0.34	1.40	156	72	77
A7	54	18:27:00	267.300	0.36	1.40	160	72	77
A8	57	18:54:00	269.265	0.35	1.40	156	69	72
A9	60	18:57:00	271.300	0.34	1.30	156	69	73
A10	63	19:00:00	273.400	0.35	1.40	158	72	74
A11	66	19:03:00	274.500	0.34	1.30	160	72	76
A12	69	19:06:00	276.500	0.36	1.40	156	72	79
	72	19:09:00	279.976					

Enter data in unshaded areas.

Sample Type	Method 5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 5
Condition	Normal
Meter Box Number	N-44
Meter Factor (γ_d)	1.0266
Minutes per Point	3.0
Barometric Pressure	30.17

Date	1/26/2016
Operator	DM/LB
Run Number	3
K Factor	3.82
Meter $\Delta H_@$	1.9218
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.22
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.276
Nozzle ID 2 (in)	0.285
Nozzle ID 3 (in)	0.279
Nozzle ID (in)	0.280

O2/CO2 Method Based on Hg Runs

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.7	13.5	
Replicate 2			
Replicate 3			
Average	7.7	13.5	78.8

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	485.7	893.9	408.2
Impinger 2	652.3	661.5	9.2
Impinger 3	608.8	611.5	2.7
Impinger 4	910.8	926.1	15.3
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			435.4
Pitot Tube ID			6-4
Saturated Percent Moisture		31.36	Standard
Calculated Percent Moisture		32.80	Volume (dscf)
Isokinetic %		108.5	42.1

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	20:00:00	280.845	0.24	0.96	161	65	69
A2	3	20:03:00	282.800	0.27	1.00	159	67	72
A3	6	20:06:00	284.000	0.28	1.10	157	66	69
A4	9	20:09:00	285.900	0.27	1.00	158	67	69
A5	12	20:12:00	287.600	0.28	1.00	159	66	69
A6	15	20:15:00	289.200	0.27	1.00	160	68	76
A7	18	20:18:00	291.200	0.29	1.10	160	72	76
A8	21	20:21:00	292.300	0.30	1.10	161	76	78
A9	24	20:24:00	294.000	0.32	1.20	160	76	78
A10	27	20:27:00	295.300	0.35	1.30	156	74	78
A11	30	20:30:00	297.100	0.36	1.40	161	75	79
A12	33	20:33:00	299.300	0.37	1.40	159	74	79
STOP	36	20:36:00	300.569					
B1	36	20:38:00	300.569	0.35	1.30	161	72	76
B2	39	20:41:00	302.400	0.40	1.50	160	73	78
B3	42	20:44:00	304.400	0.39	1.50	161	72	78
B4	45	20:47:00	306.500	0.39	1.50	162	74	80
B5	48	20:50:00	308.200	0.38	1.50	159	71	78
B6	51	20:53:00	310.200	0.36	1.40	162	69	77
B7	54	20:56:00	312.100	0.37	1.40	160	70	75
B8	57	20:59:00	314.100	0.29	1.10	157	69	76
B9	60	21:02:00	315.700	0.26	0.90	157	70	77
B10	63	21:05:00	316.800	0.27	1.00	157	70	76
B11	66	21:08:00	318.800	0.25	0.96	159	69	75
B12	69	21:11:00	320.200	0.26	0.99	160	70	76
	72	21:14:00	321.880					

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 5**
Condition	**Normal**
Sample Type:	**Method 13B**

Run Number: / Date:	1 27-Jan-15	2 27-Jan-15	3 27-Jan-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	30.02	29.99	30.02	30.01
Absolute Stack Pressure (in H2O)	30.00	29.97	30.00	29.99
Stack Static Pressure (in H2O)	-0.25	-0.25	-0.25	-0.25
Average Stack Temperature (°F)	153.4	154.5	150.2	152.7
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	32.469	33.952	34.149	33.523
Average Meter Pressure (in H2O)	0.75	0.82	0.83	0.80
Average Meter Temperature (°F)	54.9	52.4	48.4	51.9
Moisture Collected (g)	306.9	280.4	284.6	290.6
Carbon Dioxide Concentration (%V)	13.5	13.5	13.5	13.5
Oxygen Concentration (%V)	7.7	7.7	7.7	7.7
Nitrogen Concentration (%V)	78.8	78.8	78.8	78.8
Dry Gas Meter Factor (γ_δ)	1.0266	1.0266	1.0266	1.0266
Nozzle Diameter (in)	0.250	0.250	0.250	0.250
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.477	0.501	0.508	0.496
Standard Metered Volume (dscf)	34.358	36.074	36.602	35.678
Standard Metered Volume (dscm)	0.973	1.022	1.036	1.010
Stack Moisture (%V)	29.6	26.8	26.8	27.8
Saturated Moisture (%V)	27.2	27.9	25.2	26.8
Mole Fraction Dry Stack Gas	0.728	0.732	0.748	0.736
Dry Molecular Weight	30.47	30.47	30.47	30.47
Wet Molecular Weight	27.08	27.13	27.32	27.18
Average SQRT of Delta P	0.55	0.57	0.58	0.56
Stack Gas Velocity (fps)	34.2	35.6	35.6	35.2
Stack Gas Velocity (mps)	10.4	10.9	10.9	10.7
Volumetric Flow Rate (acfm)	58005	60433	60478	59639
Volumetric Flow Rate (acmm)	1643	1711	1713	1689
Volumetric Flow Rate (dscfm)	36463	38063	39234	37920
Volumetric Flow Rate (dscmm)	1033	1078	1111	1074
Percent Isokinetic	108.6	109.2	107.5	108.5
Post Test Meter QA (γ_{qa})	0.9970	0.9915	0.9897	0.9927

Fluoride Emission Rate Calculations

				Average
Orion 901 Meter Reading, ppm	0.211	0.186	0.104	N/A
Liquid Sample Volume, ml	1000	1000	1000	N/A
Sample Aliquot	10	10	10	N/A
Sample Dilution	10	10	10	N/A
Total Fluoride, mg	0.2110	0.1860	0.1035	0.1668
Fluoride Concentration, mg/DSCF	0.0061	0.0052	0.0028	0.0047
Fluoride Emissions, lbs F/hr	0.0296	0.0260	0.0147	0.0234
Rock Feed (Wet TPH)	67.20	67.20	67.20	67.2
Fluoride Emissions, lbs F/Ton Rock Feed	0.0004	0.0004	0.0002	0.0003

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 5
Condition	Normal
Meter Box Number	N-44
Meter Factor (γ_d)	1.0266
Minutes per Point	3.0
Barometric Pressure	30.12

Date	1/27/2015
Operator	WL\BM
Run Number	1
K Factor	2.50
Meter $\Delta H_@$	1.9218
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.25
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.250
Nozzle ID 2 (in)	0.250
Nozzle ID 3 (in)	0.250
Nozzle ID (in)	0.250

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	641.5	923.9	282.4
Impinger 2	722.5	737.3	14.8
Impinger 3	655.7	657.7	2.0
Impinger 4	916.3	924.0	7.7
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			306.9
Pitot Tube ID			6-4
Saturated Percent Moisture		27.17	Standard
Calculated Percent Moisture		29.63	Volume (dscf)
Isokinetic %		108.6	34.4

O2/CO2 Method From Hg Test runs

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	13.5	7.7	
Replicate 2			
Replicate 3			
Average	13.5	7.7	78.8

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	11:38:00	322.211	0.31	0.77	152	53	53
A2	3	11:41:00	323.580	0.35	0.87	160	53	54
A3	6	11:44:00	325.010	0.38	0.95	157	54	53
A4	9	11:47:00	326.530	0.33	0.82	155	54	53
A5	12	12:16:00	327.710	0.33	0.82	154	53	53
A6	15	12:19:00	329.150	0.29	0.72	150	53	52
A7	18	12:22:00	330.480	0.25	0.62	158	53	52
A8	21	12:25:00	331.680	0.25	0.62	157	53	52
A9	24	12:28:00	332.970	0.24	0.60	153	53	53
A10	27	12:31:00	334.160	0.28	0.70	150	54	53
A11	30	12:34:00	335.480	0.28	0.70	152	55	53
A12	33	12:37:00	336.810	0.28	0.70	155	56	53
STOP	36	12:40:00	338.116					
B1	36	12:44:00	338.116	0.23	0.57	157	57	54
B2	39	12:47:00	339.330	0.26	0.65	157	57	54
B3	42	12:50:00	340.570	0.27	0.67	146	58	54
B4	45	12:53:00	341.900	0.27	0.67	149	58	54
B5	48	12:56:00	343.210	0.31	0.77	157	58	54
B6	51	12:59:00	344.580	0.35	0.87	151	59	54
B7	54	13:02:00	346.060	0.37	0.92	150	59	55
B8	57	13:05:00	347.580	0.32	0.80	153	59	55
B9	60	13:08:00	349.220	0.30	0.75	153	59	55
B10	63	13:11:00	350.390	0.33	0.82	153	59	55
B11	66	13:14:00	351.840	0.33	0.82	151	60	55
B12	69	13:17:00	353.260	0.33	0.82	152	60	55
	72	13:20:00	354.680					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 5
Condition	Normal
Meter Box Number	N-44
Meter Factor (γ_d)	1.0266
Minutes per Point	3.0
Barometric Pressure	30.09

Date	1/27/2015
Operator	WL\BM
Run Number	2
K Factor	2.50
Meter $\Delta H_@$	1.9218
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.25
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.250
Nozzle ID 2 (in)	0.250
Nozzle ID 3 (in)	0.250
Nozzle ID (in)	0.250

O2/CO2 Method From Hg Test runs

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	13.5	7.7	
Replicate 2			
Replicate 3			
Average	13.5	7.7	78.8

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	759.1	1012.9	253.8
Impinger 2	687.3	704.4	17.1
Impinger 3	640.8	642.3	1.5
Impinger 4	899.6	907.6	8.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			280.4
Pitot Tube ID			6-4
Saturated Percent Moisture		27.87	Standard
Calculated Percent Moisture		26.82	Volume (dscf)
Isokinetic %		109.2	36.1

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	13:40:00	354.918	0.26	0.65	150	56	54
B2	3	13:43:00	356.210	0.28	0.70	157	56	54
B3	6	13:46:00	357.510	0.30	0.75	157	55	54
B4	9	13:49:00	358.720	0.28	0.70	156	56	53
B5	12	13:52:00	360.170	0.31	0.77	154	55	52
B6	15	13:55:00	361.510	0.34	0.85	155	55	52
B7	18	13:58:00	363.000	0.38	0.95	153	55	52
B8	21	14:01:00	364.480	0.35	0.87	154	55	52
B9	24	14:04:00	365.990	0.37	0.92	155	55	51
B10	27	14:07:00	367.470	0.42	1.05	159	55	51
B11	30	14:10:00	369.050	0.35	0.87	152	52	49
B12	33	14:13:00	370.570	0.35	0.87	153	52	49
STOP	36	14:16:00	372.010					
A1	36	14:28:00	372.010	0.39	0.97	160	53	50
A2	39	14:31:00	373.520	0.35	0.87	156	53	49
A3	42	14:34:00	375.020	0.34	0.85	159	50	49
A4	45	14:37:00	376.480	0.37	0.92	152	54	49
A5	48	14:40:00	377.970	0.36	0.90	155	54	49
A6	51	14:43:00	379.560	0.32	0.80	157	55	49
A7	54	14:46:00	380.950	0.35	0.87	154	55	49
A8	57	14:49:00	382.310	0.27	0.67	155	55	49
A9	60	14:52:00	383.580	0.25	0.62	149	54	49
A10	63	14:55:00	384.870	0.28	0.70	151	54	49
A11	66	14:58:00	386.180	0.30	0.75	153	54	49
A12	69	15:01:00	387.540	0.28	0.70	153	54	49
	72	15:04:00	388.870					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 5
Condition	Normal
Meter Box Number	N-44
Meter Factor (γ_d)	1.0266
Minutes per Point	3.0
Barometric Pressure	30.12

Date	1/27/2016
Operator	WL\BM
Run Number	3
K Factor	2.50
Meter $\Delta H_@$	1.9218
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.25
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.250
Nozzle ID 2 (in)	0.250
Nozzle ID 3 (in)	0.250
Nozzle ID (in)	0.250

O2/CO2 Method From Hg Test runs

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	13.5	7.7	
Replicate 2			
Replicate 3			
Average	13.5	7.7	78.8

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	633.5	856.2	222.7
Impinger 2	731.1	786.5	55.4
Impinger 3	656.1	657.0	0.9
Impinger 4	923.8	929.4	5.6
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			284.6
Pitot Tube ID			6-4
Saturated Percent Moisture		25.24	Standard
Calculated Percent Moisture		26.83	Volume (dscf)
Isokinetic %		107.5	36.6

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	16:20:00	389.116	0.26	0.65	150	46	46
A2	3	16:23:00	390.420	0.31	0.77	151	46	46
A3	6	16:26:00	391.780	0.31	0.77	146	46	45
A4	9	16:29:00	393.170	0.36	0.90	141	47	45
A5	12	16:32:00	394.640	0.35	0.87	143	47	45
A6	15	16:35:00	396.110	0.33	0.82	149	48	45
A7	18	16:38:00	397.550	0.35	0.87	142	49	45
A8	21	16:41:00	398.990	0.28	0.70	155	49	45
A9	24	16:44:00	400.340	0.26	0.65	154	50	46
A10	27	16:47:00	401.570	0.31	0.77	149	50	45
A11	30	16:50:00	402.950	0.29	0.72	154	50	45
A12	33	16:53:00	404.260	0.29	0.72	153	50	45
STOP	36	16:56:00	405.588					
B1	36	16:59:00	405.588	0.29	0.72	145	50	46
B2	39	17:02:00	406.940	0.30	0.75	156	51	47
B3	42	17:05:00	408.360	0.31	0.77	155	52	47
B4	45	17:08:00	409.690	0.34	0.85	150	53	47
B5	48	17:11:00	411.100	0.36	0.90	154	53	47
B6	51	17:14:00	412.580	0.40	1.00	146	53	47
B7	54	17:17:00	414.150	0.36	0.90	155	54	48
B8	57	17:20:00	415.640	0.38	0.95	150	54	47
B9	60	17:23:00	417.180	0.35	0.87	154	54	48
B10	63	17:26:00	418.610	0.39	0.97	153	54	48
B11	66	17:29:00	420.150	0.40	1.00	150	54	48
B12	69	17:32:00	421.730	0.40	1.00	149	54	48
	72	17:35:00	423.265					

AECOM

EPA Method 30B Emission Results

PCS Phosphate
Calciner #5
Mercury
Emission Calculations

O_2 Correction Basis: 3

Pollutant: Mercury

Run	Total Hg Catch ng	Sample Volume dscm	Hg Concentration mg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration mg/dscm @ 3%	Flow Rate dscfm
1	2643	0.050	0.0533	0.0064	13.5	0.129	35,540
2	2460	0.048	0.0508	0.0061	13.5	0.123	37,753
3	2337	0.047	0.0499	0.0060	13.5	0.121	35,340
AVERAGE	**2480**	**0.048**	**0.0513**	**0.0061**	**13.5**	**0.125**	**36,211**

Method 2 Velocity Traverse

Run Number	1
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #5
Condition	Normal
Static Pressure (Ps)	-0.22
Location Height (ft)	100
Barometric Pressure	29.71

Date	2/9/2016
Operator	DM/WL
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	29.61
Abs. Stack Press. (in. Hg)	29.59

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.66	13.53	
Replicate 2			
Replicate 3			
Average	7.7	13.5	78.8

Moisture By: Saturation

Saturated Percent Moisture	30.35
Calculated Percent Moisture	30.35
Mole Frac of Dry Stack Gas	0.696
Average MW of Dry Gas	29.77
Average MW of Wet Gas	26.20

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.24	155	0.490	31.3
2	0.23	157	0.480	30.7
3	0.21	157	0.458	29.4
4	0.26	159	0.510	32.7
5	0.27	162	0.520	33.4
6	0.26	162	0.510	32.8
7	0.32	156	0.566	36.2
8	0.29	155	0.539	34.4
9	0.30	159	0.548	35.1
10	0.34	155	0.583	37.3
11	0.36	162	0.600	38.6
12	0.34	160	0.583	37.4
B1	0.35	158	0.592	37.9
2	0.41	162	0.640	41.2
3	0.37	155	0.608	38.9
4	0.36	149	0.600	38.2
5	0.36	154	0.600	38.3
6	0.34	155	0.583	37.3
7	0.33	162	0.574	37.0
8	0.31	155	0.557	35.6
9	0.33	155	0.574	36.7
10	0.30	159	0.548	35.1
11	0.30	161	0.548	35.2
12	0.26	158	0.510	32.7
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		157.58	0.55	35.57

Act Volumetric Flow Rate (acfm)	60345
Std. Volumetric Flow Rate (scfm)	51029
Dry Volumetric Flow Rate (dscfm)	35540

Method 2 Velocity Traverse

Run Number	2
Client/Plant	PCS
Project Number	60402248.1
Sampling Location	Calciner #5
Condition	Normal
Static Pressure (Ps)	-0.22
Location Height (ft)	100
Barometric Pressure	29.75

Date	2/9/2016
Operator	DM/WL
Pitot Constant	0.84
Stack Geometry (R or C)?	C
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Stack Area (sq. in.)	4071.5
Corrected Baro. Pressure	29.65
Abs. Stack Press. (in. Hg)	29.63

Assumed	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.66	13.53	
Replicate 2			
Replicate 3			
Average	7.7	13.5	78.8

Moisture By: Saturation

Saturated Percent Moisture	28.88
Calculated Percent Moisture	28.88
Mole Frac of Dry Stack Gas	0.711
Average MW of Dry Gas	29.77
Average MW of Wet Gas	26.37

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.38	149	0.616	39.1
2	0.41	156	0.640	40.8
3	0.40	156	0.632	40.3
4	0.44	155	0.663	42.3
5	0.35	153	0.592	37.6
6	0.33	157	0.574	36.7
7	0.34	155	0.583	37.1
8	0.39	154	0.624	39.8
9	0.35	154	0.592	37.7
10	0.29	152	0.539	34.2
11	0.25	153	0.500	31.8
12	0.23	151	0.480	30.5
B1	0.31	160	0.557	35.6
2	0.29	162	0.539	34.5
3	0.29	155	0.539	34.3
4	0.28	153	0.529	33.7
5	0.32	156	0.566	36.1
6	0.34	156	0.583	37.2
7	0.36	162	0.600	38.4
8	0.34	158	0.583	37.2
9	0.35	158	0.592	37.8
10	0.33	156	0.574	36.6
11	0.34	160	0.583	37.3
12	0.35	157	0.592	37.8
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		155.75	0.58	36.85

Act Volumetric Flow Rate (acfm)	62506
Std. Volumetric Flow Rate (scfm)	53086
Dry Volumetric Flow Rate (dscfm)	37753

Method 2 Velocity Traverse

Run Number	3	Date	2/9/2016
Client/Plant	PCS	Operator	DM/WL
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #5	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.22	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	29.79	Corrected Baro. Pressure	29.69
		Abs. Stack Press. (in. Hg)	29.67

Assumed	CO2 Percent	O2 Percent	
Replicate 1	7.66	13.53	
Replicate 2			
Replicate 3			N2 Percent
Average	7.7	13.5	78.8

Moisture By: Saturation

Saturated Percent Moisture	31.77
Calculated Percent Moisture	31.77
Mole Frac of Dry Stack Gas	0.682
Average MW of Dry Gas	29.77
Average MW of Wet Gas	26.03

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
B1	0.25	160	0.500	32.2
2	0.26	161	0.510	32.8
3	0.28	157	0.529	34.0
4	0.28	157	0.529	34.0
5	0.30	158	0.548	35.2
6	0.29	161	0.539	34.7
7	0.28	160	0.529	34.0
8	0.31	160	0.557	35.8
9	0.32	161	0.566	36.4
10	0.34	162	0.583	37.6
11	0.36	159	0.600	38.6
12	0.35	158	0.592	38.0
A1	0.36	162	0.600	38.7
2	0.41	159	0.640	41.2
3	0.38	160	0.616	39.7
4	0.38	162	0.616	39.7
5	0.40	160	0.632	40.7
6	0.37	159	0.608	39.1
7	0.37	163	0.608	39.2
8	0.31	161	0.557	35.9
9	0.27	158	0.520	33.4
10	0.26	158	0.510	32.8
11	0.25	157	0.500	32.1
12	0.24	159	0.490	31.5
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		159.67	0.56	36.13

Act Volumetric Flow Rate (acfm)	61287
Std. Volumetric Flow Rate (scfm)	51791
Dry Volumetric Flow Rate (dscfm)	35340

AECOM

METHOD 30B

Run No. 1

Date	2/9/2016		Sorbent Trap Number	OL328488	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #5		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL/DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	11	Barometric Pres. (" Hg)	29.61	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:15:00	0.000		0.75		311	54	37	254	3
	5	14:20	5.74		0.75		314	57	34	257	2
	10	14:25	9.61		0.75		300	58	35	259	2
	15	14:30	13.34		0.75		275	54	35	260	2
	20	14:35	17.09		0.75		276	55	35	261	2
	25	14:40	20.70		0.75		276	56	35	261	2
	30	14:45	24.56		0.75		277	56	35	260	2
	35	14:50	28.27		0.75		286	57	35	261	4
	40	14:55	32.32		0.75		285	57	35	264	3
	45	15:00	36.30		0.75		280	60	35	264	3
	50	15:05	40.35		0.75		279	60	35	264	3
	55	15:10	43.88		0.75		279	62	35	264	4
	60	15:15	48.268		0.75		278	62	35	264	4
TOTAL			48.268	48.2680	0.75	160	286	58	35	261	3
Target Volume											
Spike Amount (ng)	2000										

Comments: Stack Temp for Run 1A and 1B is an average of Runs 2 and 3.

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**49609.65052**	**49.6096505**

AECOM

METHOD 30B

Date	2/9/2016		Sorbent Trap Number	OL321111	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #5		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL/DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	10	Barometric Pres. (" Hg)	29.61	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:15:00	0.000		0.75		311	55	37	254	3
	5	14:20	4.05		0.75		314	55	34	257	3
	10	14:25	7.54		0.75		300	54	35	259	3
	15	14:30	11.82		0.75		275	58	35	260	3
	20	14:35	15.89		0.75		276	55	35	261	2
	25	14:40	20.02		0.75		276	55	35	261	3
	30	14:45	24.19		0.75		277	55	35	260	3
	35	14:50	28.19		0.75		286	57	35	261	3
	40	14:55	32.07		0.75		285	57	35	264	3
	45	15:00	35.97		0.75		280	63	35	264	3
	50	15:05	40.01		0.75		279	63	35	264	3
	55	15:10	44.22		0.75		279	62	35	264	3
	60	15:15	48.356		0.75		278	62	35	264	3
TOTAL			48.356	48.356	0.75	160	286	58	35	261	3
Target Volume											
Spike Amount (ng)											

Comments: Stack Temp for Run 1A and 1B is an average of Runs 2 and 3.

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**49677.93114**	**49.6779311**

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AECOM

METHOD 30B

Run No. 2

Date	2/8/2016		Sorbent Trap Number	OL304686	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #5		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL/DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	10	Barometric Pres. (" Hg)	29.65	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	15:30:00	0.000		0.75	161	286	65	35	264	3
	5	15:35	4.16		0.75	161	279	65	35	264	3
	10	15:40	8.12		0.75	161	278	64	35	266	3
	15	15:45	12.13		0.75	158	280	63	35	266	3
	20	15:50	16.21		0.75	163	281	63	35	266	3
	25	15:55	20.13		0.75	161	282	62	35	262	3
	30	16:00	24.02		0.75	159	281	61	35	264	3
	35	16:05	28.04		0.75	160	280	62	35	263	3
	40	16:10	31.81		0.75	161	279	62	35	262	3
	45	16:15	35.99		0.75	161	278	61	35	261	3
	50	16:20	40.20		0.75	160	282	61	35	259	3
	55	16:25	44.13		0.75	159	280	61	35	261	3
	60	16:30	47.890		0.75	160	281	61	35	261	3
TOTAL			47.8900	47.8900	0.75	160	281	62	35	263	3
Target Volume											
Spike Amount (ng)	2000										

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**48830.10662**	**48.8301066**

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AECOM

METHOD 30B

Run No. 2

Date	2/8/2016		Sorbent Trap Number	OL321123	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #5		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL/DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	10	Barometric Pres. (" Hg)	29.65	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
A1	0	15:30:00	0.000		0.75	161	286	65	35	264	3
	5	15:35	4.270		0.75	161	279	65	35	264	3
	10	15:40	8.340		0.75	161	278	65	35	266	3
	15	15:45	12.310		0.75	158	280	64	35	266	3
	20	15:50	16.480		0.75	163	281	63	35	266	3
	25	15:55	20.370		0.75	161	282	63	35	262	3
	30	16:00	24.240		0.75	159	281	63	35	264	3
	35	16:05	28.170		0.75	160	280	63	35	263	3
	40	16:10	32.130		0.75	161	279	63	35	262	3
	45	16:15	36.210		0.75	161	278	63	35	261	3
	50	16:20	40.120		0.75	160	282	63	35	259	3
	55	16:25	43.700		0.75	159	280	63	35	261	3
	60	16:30	47.2670		0.75	160	281	63	35	261	3
TOTAL			47.2670	47.2670	0.75	160	281	64	35	263	3
Target Volume											
Spike Amount (ng)											

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**48088.5913**	**48.0885913**

AECOM

METHOD 30B

Date	2/8/2016		Sorbent Trap Number	OL328317	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.0180	
Location	Calciner #5		Nozzle ID (inches)		DGM Cal Factor (Y)	1.0180	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL/DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	10	Barometric Pres. (" Hg)	29.69	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	16:41:00	0.000		0.75	155	278	53	35	256	3
	5	16:46	3.410		0.75	157	280	53	35	260	3
	10	16:51	6.900		0.75	159	281	53	35	261	3
	15	16:56	10.870		0.75	160	283	53	35	261	3
	20	17:01	14.880		0.75	161	280	55	35	261	3
	25	17:06	18.970		0.75	161	279	55	35	262	3
	30	17:11	22.980		0.75	162	277	55	35	261	3
	35	17:16	26.830		0.75	158	280	54	35	262	3
	40	17:21	30.030		0.75	157	281	54	35	262	3
	45	17:26	33.900		0.75	158	281	54	35	262	3
	50	17:31	37.950		0.75	160	280	54	35	259	3
	55	17:36	42.010		0.75	160	279	54	35	260	3
	60	17:41	45.5150		0.75	158	279	54	35	260	3
TOTAL			45.5150	45.5150	0.75	159	280	54	35	261	3
Target Volume											
Spike Amount (ng)	2000										

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**47236.71212**	**47.2367121**

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AECOM

METHOD 30B

Run No. 3

Date	2/8/2016		Sorbent Trap Number	OL321185	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.018	
Location	Calciner #5		Nozzle ID (inches)		DGM Cal Factor (Y)	1.018	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter		
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL/DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	10	Barometric Pres. (" Hg)	29.69	O2/CO2 Method		

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	16:41:00	0.000		0.75	155	278	55	35	256	3
	5	16:46	3.320		0.75	157	280	54	35	260	3
	10	16:51	8.280		0.75	159	281	54	35	261	3
	15	16:56	12.120		0.75	160	283	54	35	261	3
	20	17:01	16.050		0.75	161	280	55	35	261	3
	25	17:06	19.560		0.75	161	279	54	35	262	3
	30	17:11	22.810		0.75	162	277	55	35	261	3
	35	17:16	26.410		0.75	158	280	55	35	262	3
	40	17:21	30.160		0.75	157	281	55	35	262	3
	45	17:26	33.550		0.75	158	281	55	35	262	3
	50	17:31	37.360		0.75	160	280	55	35	259	3
	55	17:36	41.400		0.75	160	279	55	35	260	3
	60	17:41	44.8800		0.75	158	279	55	35	260	3
TOTAL			44.8800	44.8800	0.75	159	280	55	35	261	3
Target Volume											
Spike Amount (ng)											

Comments: Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**46508.03463**	**46.5080346**

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AECOM

Plant Name	PCS	Date	02-09-16	Page	1 of 1
Project Number	60402248.10	Condition	Normal	Initial Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 20 "Hg
Location (Source)	Calciner #5	Run	#1		
Meter ID & Cal Factors	Box #1	Operator	WL / DM	Final Leak Rate	1) 0 @ 11 "Hg; 2) 0 @ 10 "Hg
Sorbent Trap IDs	1) OL328488 spike; 2) OL321111	Bar. Press. (in. H_2O)		Third Bed Spike Level	1) 200ng spike; 2) 0
		Elevation (relative to Barometer) (ft)			

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	ΔP (in. H_2O)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1415	0	.75		311	37	254	54	3
2)		0	.75					55	3
1)	1420	5.74	.75		314	34	257	57	2
2)		4.05	.75					55	3
1)	1425	9.61	.75		300	35	259	58	2
2)		7.54	.75					54	3
1)	1430	13.34	.75		275	35	260	54	2
2)		11.82	.75					58	3
1)	1435	17.09	.75		276	35	261	55	3
2)		15.89	.75					55	2
1)	1440	20.70	.75		276	35	261	56	2
2)		20.02	.75					55	3
1)	1445	24.56	.75		277	35	260	56	2
2)		24.19	.75					55	3
1)	1450	28.27	.75		286	35	261	57	4
2)		28.19	.75					57	3
1)	1455	32.32	.75		285	35	264	57	3
2)		32.07	.75					57	3
1)	1500	36.30	.75		280	35	264	60	3
2)		35.97	.75					63	3
1)	1505	40.35	.75		279	35	264	60	3
2)		40.01	.75					63	3
1)	1510	43.88	.75		279	35	264	62	4
2)		44.22	.75					62	3
1)	1515	48.268	.75		278	35	264	62	4
2)		48.356	.75					62	3
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name	PCS	Date	02/01/16	Page	1 of 1
Project Number	60402248.10	Condition	Normal	Initial Leak Rate	1) 0 @ 20 "Hg
Location (Source)	Calciner #5	Run	2		2) 0 @ 20 "Hg
Meter ID & Cal Factors	Box #1	Operator	WL / DM	Final Leak Rate	1) 0 @ 10 "Hg
Sorbent Trap IDs	1) OL3046B6	Bar. Press. (in. H_2O)			2) 0 @ 10 "Hg
	2) OL321123	Elevation (relative to Barometer) (ft)		Third Bed Spike Level	1) 2000 ng
					2) 0

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	Stack (°F)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)		0	.75					65	3
2)	1530	0	.75	161	286	35	264	65	3
1)		4.16	.75					65	3
2)	1535	4.27	.75	161	279	35	264	65	3
1)		8.12	.75					64	3
2)	1540	8.34	.75	161	278	35	266	65	3
1)		12.13	.75					63	3
2)	1545	12.31	.75	158	280	35	266	64	3
1)		16.21	.75					63	3
2)	1550	16.48	.75	163	281	35	266	63	3
1)		20.13	.75					62	3
2)	1555	20.37	.75	161	282	35	262	63	3
1)		24.02	.75					61	3
2)	1600	24.24	.75	159	281	35	264	63	3
1)		28.04	.75					62	3
2)	1605	28.17	.75	160	280	35	263	63	3
1)		31.81	.75					62	3
2)	1610	32.13	.75	161	279	35	262	63	3
1)		35.99	.75					61	3
2)	1615	36.21	.75	161	278	35	261	63	3
1)		40.20	.75					61	3
2)	1620	40.42	.75	160	282	35	259	63	3
1)		44.13	.75					61	3
2)	1625	43.70	.73	159	280	35	261	63	3
1)		47.890	.75					61	3
2)	1630	47.267	.75	160	281	35	261	63	3
1)									
2)									
1)									
2)									

ments:

AECOM

Plant Name: PCS	Date: 02/18/16	Page: 1 of 1	
Project Number:	Condition: Normal	Initial Leak Rate	1) 0 @ 20 "Hg; 2) 0 @ 20 "Hg
Location (Source): Calgines #5	Run: 3		
Meter ID & Cal Factors: Box #1	Operator: WL/DM	Final Leak Rate	1) 0 @ 10 "Hg; 2) 0 @ 10 "Hg
Sorbent Trap IDs: 1) OL32B317; 2) OL321185	Bar. Press. (in. H_2O):		
	Elevation (relative to Barometer) (ft):	Third Bed Spike Level	1) 2000 ng; 2) 100 ng

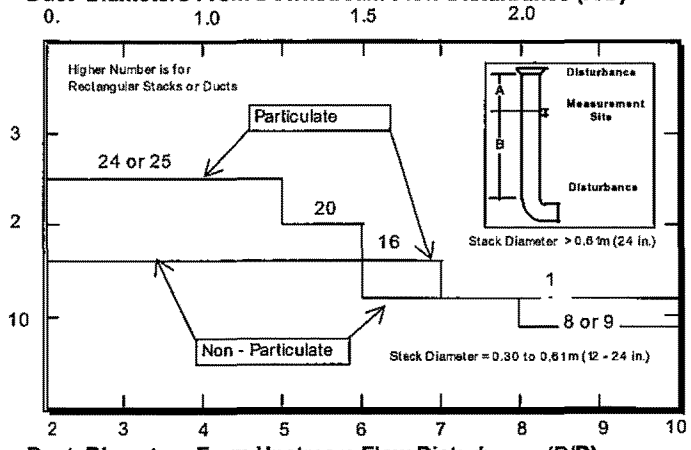
Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	Stack (°F)	Temperature (°F)				Vacuum (in. Hg)
					Sorbent	Chiller	Heat-Traced Line	Meter	
1)	1641	0	.75	155	278	35	256	53	3
2)		0	.75					55	3
1)	1646	3.41	.75	157	280	35	260	53	3
2)		3.32	.75					54	3
1)	1651	6.90	.75	159	281	35	261	53	3
2)		8.28	.75					54	3
1)	1656	10.87	.75	160	283	35	261	53	3
2)		12.12	.75					54	3
1)	1701	14.88	.75	161	280	35	261	55	3
2)		16.05	.75					55	3
1)	1706	18.97	.75	161	279	35	262	55	3
2)		19.56	.75					54	3
1)	1711	22.98	.75	162	277	35	261	55	3
2)		22.81	.75					55	3
1)	1716	26.83	.75	158	280	35	262	54	3
2)		26.41	.75					55	3
1)	1721	30.03	.75	157	281	35	262	54	3
2)		30.16	.75					55	3
1)	1726	33.90	.75	158	281	35	262	54	3
2)		33.55	.75					55	3
1)	1731	37.95	.75	160	280	35	259	54	3
2)		37.36	.75					55	3
1)	1736	42.01	.75	160	279	35	260	54	3
2)		41.40	.75					55	3
1)	1741	45.515	.75	158	279	35	260	54	3
2)		44.880	.75					55	3
1)									
2)									
1)									
2)									

Comments:

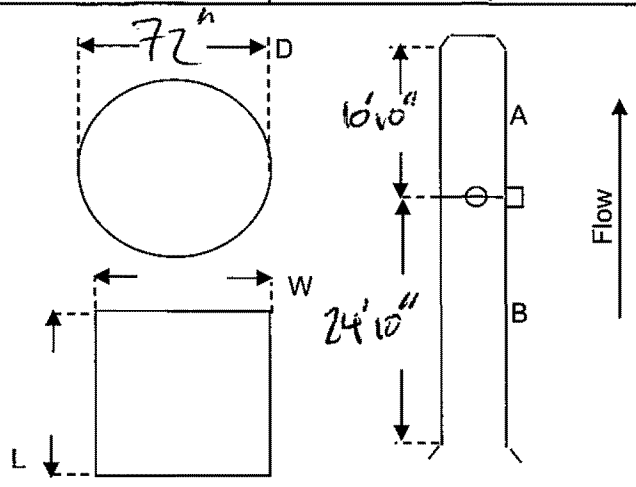
AECOM	FIELD SAMPLING DATA SHEET Sample and Velocity Traverse for Stationary Sources	EPA Method 1

Client / Plant: PCS	Project #: 60402248	Location: Cokenet #5	Date: 1/26/16
Number of Traverse Points Chosen: 24	Number of Ports: 2	Number of Points per Port: 12	

Duct Diameters From Downstream Flow Disturbance (A/D)



Duct Diameters From Upstream Flow Disturbance (B/D)



Deq = 2LW / (L+W) _____
Dnstream Diameters (A/D) _____
Upstream Diameters (B/D) _____

Cross-Sectional Layout of Rectangular Stacks

Traverse Points	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

Traverse Point	Fraction of Diameter	Distance From Wall	Nipple Length	Point Location
1	2.1	1.5	5"	6.5
2	6.7	4.8		9.8
3	11.8	8.5		13.5
4	17.7	12.8		17.8
5	25.0	18.0		23.0
6	36.6	25.6		30.6
7	64.4	46.4		51.4
8	75.0	54.0		59.0
9	82.3	59.3		64.3
10	88.2	63.5		68.5
11	93.3	67.2		72.2
12	97.9	70.5		75.5

LOCATION OF TRAVERSE POINT IN RECTANGULAR STACKS.

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

AECOM

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE _____ OF _____

Client/Plant: PCS	Project #: 60402245.10	Date: 1-26-16	Operator(s): DW/[illegible]
Location: Calcina #5	Condition: Normal	Moisture Run #:	Duration (min):
DGM#: N-44	CF (Yd): 1.0266	$\Delta H_@$: 1.9218	Cp: 0.84
P_{bar} ("Hg): 30.29	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -1.22	
Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100'
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Pitot Tube ID#: 6-4
O_2 (%/time)	% (:)	% (:)	% (:)
CO_2 (%/time)	% (:)	% (:)	% (:)

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #:		Flow Run #:		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		12:32	12:53	:	:	:	:	
						ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					A1		155					1
					2		154					3
					3		154					6
					4		154					8
					5		153					12
					6		152					10
					7		155					12
					8		154					5
					9		153					9
					10		152					7
					11		153					8
					12		151					13
					B1		145					5
					2		147					7
					3		149					9
					4		148					4
					5		145					8
					6		152					14
					7		152					16
					8		155					16
					9		155					3
					10		156					9
					11		158					2
					12		159					2

Comments:

Test Run 1 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-08-2016 16:07:41	-0.095	-0.012
02-08-2016 16:08:40	-0.090	-0.009
02-08-2016 16:09:40	-0.095	0.007
02-08-2016 16:10:41	-0.092	-0.004
Pause		
End Pause		
02-08-2016 16:12:40	19.096	21.076*
02-08-2016 16:13:41	19.209	20.434*
02-08-2016 16:14:40	19.215	20.098
02-08-2016 16:15:40	19.222	19.966
Pause		
End Pause		
02-08-2016 16:19:40	10.010	9.663
02-08-2016 16:20:40	10.007	9.561
02-08-2016 16:21:40	10.007	9.440
02-08-2016 16:22:40	10.005	9.326
Pause		
End Pause		
02-08-2016 16:27:40	18.954	8.015
02-08-2016 16:28:40	19.106	6.453
02-08-2016 16:29:40	19.017	6.584
02-08-2016 16:30:40	19.307*	6.588
02-08-2016 16:31:40	19.758*	6.529
Pause		
End Pause		
02-08-2016 16:35:40	13.952	3.468
02-08-2016 16:36:40	13.959	-0.106
02-08-2016 16:37:40	13.968	-0.095
02-08-2016 16:38:40	13.973	0.129
02-08-2016 16:39:40	13.980	1.733
02-08-2016 16:40:40	13.981	0.270
02-08-2016 16:41:40	13.990	0.545
Run Averages	O2 %	CO2 %
02-08-2016 16:42:23	12.569*	6.401*

Operator: Lance Burleson
Plant Name: PCS Aurora
Location: Calciner #~~4~~5 DCM
Test Run 1 End

17cv1906 Sierra Club v. EPA - 6/22 Production

Test Run 1 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-08-2016 17:31:23	-0.065	0.035
02-08-2016 17:32:23	-0.067	0.054
02-08-2016 17:33:23	-0.072	0.070
02-08-2016 17:34:23	-0.072	0.069
02-08-2016 17:35:23	-0.076	0.088
Pause		
End Pause		
02-08-2016 17:37:22	19.197	20.528
02-08-2016 17:38:22	19.229	20.797*
02-08-2016 17:39:22	19.239	20.790*
02-08-2016 17:40:22	19.235	20.782*
02-08-2016 17:41:22	19.240	20.617*
02-08-2016 17:42:22	19.241	20.596*
Pause		
End Pause		
02-08-2016 17:44:23	10.034	9.960
02-08-2016 17:45:23	10.023	9.658
02-08-2016 17:46:23	10.023	9.743
02-08-2016 17:47:23	10.022	9.808
02-08-2016 17:48:23	10.019	9.875
02-08-2016 17:49:23	10.018	9.838
Pause		
End Pause		
02-08-2016 17:51:22	20.680*	7.089
02-08-2016 17:52:23	20.666*	7.435
02-08-2016 17:53:23	20.665*	7.474
02-08-2016 17:54:23	20.663*	7.516
Pause		
End Pause		
02-08-2016 17:56:23	14.393	0.375
02-08-2016 17:57:23	13.630	-0.123
02-08-2016 17:58:23	13.629	-0.118
02-08-2016 17:59:23	13.618	-0.128
02-08-2016 18:00:22	13.625	-0.123
Pause		
End Pause		
02-08-2016 18:02:23	18.834*	3.316
02-08-2016 18:03:23	20.668*	7.857
02-08-2016 18:04:23	20.684*	7.868
02-08-2016 18:05:23	20.680*	7.886
02-08-2016 18:06:23	20.680*	7.910
02-08-2016 18:07:23	20.685*	7.930
Pause		
End Pause		
02-08-2016 18:10:22	13.475	-0.058
02-08-2016 18:11:22	13.456	-0.043
02-08-2016 18:12:22	13.460	-0.038
02-08-2016 18:13:22	13.457	-0.037
02-08-2016 18:14:22	13.461	-0.026
Run Averages	O2 %	CO2 %
02-08-2016 18:14:45	13.684*	6.642*

Operator: Lance Burleson
Plant Name: PCS Aurora
Location: Calciner #5 aux
Test Run 1 End

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 01/27/16	Operator(s): WL/BM
Location: Cal #5	Condition: Normal	Run #: 1	Duration (min): 72
DGM#: N-44	CF (Yd): 1.0266	$\Delta H_@$: 1.9218	Cp: 0.84
K-Factor: 2.50	P_{bar} ("Hg): 30.11	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.25

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 10	Source Height (ft):	Duct Diameter ("):
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min:	Vac. ("Hg): 8	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: ~~.245~~ 0.250	
Probe & Pitot ID: RTP 6-4			Nozzle D2 (") ⊘: ~~.245~~ 0.250	
			Nozzle D3 (") ⊖: ~~.240~~ 0.250	
			Average Nozzle D ("): ~~.241~~ 0.250	

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
Port												
A1	1138	0	322.211	.31	.77	152			48	53	53	2
2	Lost	3	323.58	.35	.87	160			46	53	54	2
3	Point	6	325.01	.38	.95	157			46	54	53	2
4		9	326.53	.33	.82	155			45	54	53	2
5	1216	12	327.71	.33	.82	154			44	53	53	2
6		15	329.15	.29	.72	150			46	53	52	2
7		18	330.48	.25	.62	158			44	53	52	2
8		21	331.68	.25	.62	157			44	53	52	2
9		24	332.97	.24	.60	153			44	53	53	2
10		27	334.16	.28	.70	150			46	54	53	3
11		30	335.48	.28	.70	152			46	55	53	3
12		33	336.81	.28	.70	155			46	56	53	3
	1240	36	338.116	Port Change								
B1	1244		338.116	.23	.57	157			50	57	54	3
2		39	339.33	.26	.65	157			48	57	54	3
3		42	340.57	.27	.67	146			48	58	54	3
4		45	341.90	.27	.67	149			47	58	54	3
5		48	343.21	.31	.77	157			48	58	54	4
6		51	344.58	.35	.87	151			47	59	55	5
7		54	346.06	.37	.92	150			47	59	55	5
8		57	347.58	.32	.80	153			49	59	55	5
9		60	349.22	.30	.75	153			49	59	55	5
10		63	350.39	.33	.82	153			48	59	55	5
11		66	351.84	.33	.82	151			48	60	55	5
12		69	353.26	.33	.82	152			48	60	55	5
	1320	72	354.680									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 1-27-16
Location: Cal #5	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	641.5	923.9	
2	DI H_2O	100	GS	722.5	737.3	
3	Empty	--	MOD	655.7	657.7	
4	Silica Gel	--	MOD	916.3	924.0	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM — FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 01/27/16	Operator(s): WL/BM
Location: Cal. #5	Condition: Normal	Run #: 2	Duration (min): 72
DGM#: N-44	CF (Yd): 1.0266	$\Delta H_@$: 1.9218	Cp: 0.84
K-Factor: 2.50	P_{bar} ("Hg): 30.11	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.25

Initial Leak ✓ (<0.02 ft³/min; >10"Hg)	ft³/min: 0	Vac. ("Hg): 12	Source Height (ft):		Duct Diameter ("):
Final Leak ✓ (<0.02 ft³/min; >max vacuum)	ft³/min: .0005	Vac. ("Hg): 8	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓			
Probe & Pitot ID: RTP-6-4			Nozzle D1 (") Ø: ~~.245~~ FC 0.250		
			Nozzle D2 (") ⊘: ~~.245~~ FC 0.25		
			Nozzle D3 (") ⊖: ~~.240~~ FC 0.25		
			Average Nozzle D ("): ~~.241~~ FC 0.2		

Sample Point Port	Time: Clock	Time: Run (min)	DGM Volume (ft³)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B1	1340	0	354.918	.26	.65	150			53	56	54	2
2		3	356.21	.28	.70	157			51	56	54	2
3		6	357.51	.30	.75	157			49	55	54	2
4		9	358.72	.28	.70	156			49	56	53	2
5		12	360.17	.31	.77	154			48	55	52	2
6		15	361.51	.34	.85	155			47	55	52	3
7		18	363.00	.38	.95	153			47	55	52	4
8		21	364.48	.35	.87	154			47	55	52	4
9		24	365.99	.37	.92	155			48	55	51	5
10	1409	27	367.47	.42	1.05	159			47	55	51	5
11		30	369.05	.35	.87	152			47	52	49	5
12		33	370.57	.35	.87	153			47	52	49	5
1424	1416	36	372.010			Port Change						
A1	1428		372.010	.39	.97	160			46	53	50	5
2		39	373.52	.35	.87	156			46	53	49	5
3		42	375.02	.34	.85	159			46	50	49	5
4		45	376.48	.37	.92	152			47	54	49	6
5		48	377.97	.36	.90	155			47	54	49	6
6		51	379.56	.32	.80	157			48	55	49	6
7		54	380.95	.35	.87	154			48	55	49	6
8		57	382.31	.27	.67	155			49	55	49	5
9		60	383.58	.25	.62	149			50	54	49	5
10		63	384.87	.28	.70	151			49	54	49	5
11		66	386.18	.30	.75	153			49	54	49	5
12		69	387.54	.28	.70	153			49	54	49	5
	1504	72	388.870									

COMMENTS 1409

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.10	Date: 1-27-16
Location: Cal #5	Condition: Normal	Run #: 2

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	759.1	1012.9	
2	DI H_2O	100	GS	687.3	704.4	
3	Empty	--	MOD	640.8	642.3	
4	Silica Gel	--	MOD	899.6	907.6	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 01/27/16	Operator(s): WL/BM
Location: Cal. #5	Condition: Normal	Run #: 3	Duration (min): 72
DGM#: N-44	CF (Yd): 1.0266	$\Delta H_@$: 1.9218	Cp: 0.84
K-Factor: 2.50	P_{bar} ("Hg): 30.11	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.35

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 12	Source Height (ft):	Duct Diameter ("):
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 8	Duct Width ("):	Duct Length ("):

Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: ~~.245~~ @ 0.25
Probe & Pitot ID: RTP 6-4			Nozzle D2 (") ⊘: ~~.245~~ @ 0.25
			Nozzle D3 (") ⊖: ~~<.240~~ @ 0.25
			Average Nozzle D ("): ~~<.241~~ @ 0.2

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
Pout												
A1	1620	0	389.116	.26	.65	150			42	46	46	2
2		3	390.42	.31	.77	151			39	46	46	2
3		6	391.78	.31	.77	146			39	46	45	2
4		9	393.17	.36	.90	141			39	47	45	2
5		12	394.64	.35	.87	143			38	47	45	2
6		15	396.11	.33	.82	149			39	48	45	2
7		18	397.55	.35	.87	142			40	49	45	2
8		21	398.99	.28	.70	155			40	49	45	2
9		24	400.34	.26	.65	154			41	50	46	2
10		27	401.57	.31	.77	149			41	50	45	2
11		30	402.95	.29	.72	154			41	50	45	2
12		33	404.26	.29	.72	153			41	50	45	2
	1656	36	405.588		— Port Change —							
B1	1659		405.588	.29	.72	145			43	50	46	2
2		39	406.94	.30	.75	156			41	51	47	2
3		42	408.36	.31	.77	155			41	52	47	2
4		45	409.69	.34	.85	150			40	53	47	2
5		48	411.10	.36	.90	154			41	53	47	2
6		51	412.58	.40	1.00	146			40	53	47	3
7		54	414.15	.36	.90	155			41	54	48	3
8		57	415.64	.38	.95	150			41	54	47	3
9		60	417.18	.35	.87	154			41	54	48	3
10		63	418.61	.39	.97	153			42	54	48	3
11		66	420.15	.40	1.00	150			42	54	48	3
12		69	421.73	.40	1.00	149			42	54	48	3
	1735	72	423.265									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60402248.0	Date: 1-27-16
Location: Calciner #5	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	633.5	856.2	
2	DI H_2O	100	GS	731.1	786.5	
3	Empty	--	MOD	656.1	657.0	
4	Silica Gel	--	MOD	923.8	929.4	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

FIELD SAMPLING DATA SHEET

AECOM

Particulate Matter M5/202

EPA Method 5/202

PAGE _____ OF _____

Client/Plant: PCS	Project #: 60402248.10	Date: 1-26-16	Operator(s): DW/LB
Location: Calciner #5	Condition: Normal	Run #: 1	Duration (min): 72
Console#: N-44	CF (Yd): 1.0266	$\Delta H_@$: 1.9218	Cp: 0.84
K-Factor: 3.82	P_{bar} ("Hg): ~~30.00~~ 30.10	Height w.r.t. Barometer (ft): ~~100~~	P_{static} ("H_2O): -.22

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): ~~23~~	Source Height (ft): 100'		Duct Diameter ("): 72'
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg): 8	Duct Width ("): –		Duct Length ("): –
Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P:	-P:	Nozzle D1 (") Ø: .276
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D2 (") Ø: .285
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D3 (") Ø: .279
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Average Nozzle D ("): .278 DW

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM ~~Inlet~~ Outlet	DGM ~~Outlet~~ Inlet	Pump Vac. ("Hg)
A1	1445	0	193.675	0.23	.88	~~256~~	282	235	66	75	79	75	3
2	1448	3	195.3	.22	.84	162	274	254	65	71	80	76	3
3		6	196.6	.21	.80	159	274	264	61	70	80	75	3
4		9	198.5	.25	.96	157	278	256	59	72	82	76	4
5		12	200.1	.25	.96	162	284	251	57	74	83	77	4
6		15	201.6	.25	.96	162	287	251	56	76	85	78	4
7		18	203.9	.32	1.22	153	291	251	57	74	84	78	4
8		21	205.3	.30	1.15	157	292	253	56	80	86	78	4
9		24	206.6	.30	1.15	158	291	251	55	80	86	78	4
10		27	208.1	.33	1.24	156	294	253	56	80	86	79	4
11		30	209.8	.37	1.41	163	291	252	56	81	86	~~78~~	~~5~~
12		33	211.9	.34	1.3	162	283	252	55	81	82	78	5
STOP		36	213.441			PORT CHANGE							
B1		36	213.441	.36	1.4	158	278	252	55	73	85	80	5
2		39	216.2	.40	1.5	161	265	253	49	70	85	79	5
3		42	217.9	.34	1.4	159	261	253	49	68	84	79	5
4		45	219.9	.35	1.4	158	261	251	51	67	86	80	5
5		48	221.9	.35	1.3	162	264	253	52	67	84	79	5
6		51	223.6	.33	1.2	157	263	251	51	67	87	81	5
7		54	225.4	.34	1.3	158	258	254	52	67	86	78	5
8		57	227.2	.30	1.2	161	269	254	52	68	86	82	5
9		60	229.1	.31	1.2	160	268	253	50	67	86	80	5
10		63	231.1	.29	1.1	162	266	254	49	68	85	~~78~~	5
11		66	232.8	.30	1.2	162	270	251	49	70	~~85~~	78	5
12		69	234.6	.25	.96	159	270	~~253~~	52	75	87	78	4
	1604	72	235.716										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60402248.10	Date: 1-26-16
Location: Cal. #5	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	483.6	835.8	
2	MT	0	MGS	544.8	573.4	
3	Water	100	MGS	721.0	732.8	
4	Silica Gel	350	MGS	895.8	910.8	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14131	Tare Wt. (g)	0.37535
	ID#:		Tare Wt. (g)	
	ID#:	0116-101	Tare Wt. (g)	N/A

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET
Particulate Matter M5/202

EPA Method 5/202

PAGE _____ OF _____

Client/Plant: PCS	Project #: 60402248.10	Date: 1-26-16	Operator(s): DW/LB
Location: Calciner #5	Condition: Normal w/wash	Run #: 2 (wash cycle)	Duration (min): 72
Console#: N-44	CF (Yd): 1.0266	$\Delta H_@$: 1.9218	Cp: 0.84
K-Factor: 3.82	P_{bar} ("Hg): 30.10	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.22

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 13	Source Height (ft): 600	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0	Vac. ("Hg): 12	Duct Width ("): --	Duct Length ("): --

Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P: ✓	-P: ✓	Nozzle D1 (") Ø:		
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D2 (") ⊘:			
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Nozzle D3 (") ⊖:			
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)	Average Nozzle D ("):			

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B1	1650	0	236.970	.40	1.50	162	250	232	62	70	72	78	5
2		3	237.9	.40	1.50	164	252	240	61	70	75	77	5
3		6	239.6	.39	1.5	159	242	253	60	70	77	[illegible]	5
4		9	241.5	.43	1.6	157	247	256	60	70	74	79	5
5		12	243.16	.36	1.4	154	233	260	64	73	74	81	6
6		15	245.4	.32	1.2	160	240	256	61	75	74	80	5
7		18	247.1	.34	1.3	161	240	253	61	76	76	80	5
8		21	248.9	.35	1.5	161	244	252	62	77	76	81	6
9		24	250.8	.39	1.5	161	250	252	59	75	74	81	6
10		27	252.5	.32	1.2	154	252	253	56	72	74	79	6
11		30	254.1	.28	1.1	159	254	252	55	70	74	78	6
12		33	255.8	.21	0.8	157	259	253	54	70	74	79	5
STOP		36	257.318				PORT CHANGE						
A1		36	257.318	.29	1.1	159	259	253	58	69	74	79	5
2		39	258.7	.28	1.01	161	253	253	57	70	74	80	6
3		42	260.556	.29	1.11	154	259	253	60	69	74	77	5
4		45	262.1	.28	1.1	151	260	253	64	70	73	77	5
5		48	264.0	.33	1.3	154	260	253	60	70	72	75	6
6		51	265.8	.34	1.4	156	256	254	70	71	72	77	6
7	1824 →	54	267.3	.36	1.4	160	260	252	72	70	72	77	6
8	1841	57	269.265	.35	1.4	156	260	253	67	68	69	72	6
9		60	271.3	.34	1.3	156	256	253	66	69	69	73	6
10		63	273.4	.35	1.4	158	258	251	67	72	69	74	6
11		66	274.5	.34	1.3	160	261	252	67	74	72	72	6
12		69	276.5	.36	1.4	156	260		64	78	72	79	6
END	1910	72	279.976										

COMMENTS: ST: 1650 Test Paused 1735 Paused 1824
Wash cycle END: 1721 ST: 1809 1809

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: RCS	Project #: 60482248.10	Date: 1-26-16
Location: Cal. # 5	Condition: Normal	Run #: 2

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	501.4	867.8	
2	MT	0	MGS	592.1	598.7	
3	Water	100	MGS	696.4	706.5	
4	Silica Gel	350	MGS	856.7	879.1	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14130	Tare Wt. (g)	0.37225
	ID#:		Tare Wt. (g)	
	ID#:	0116-101	Tare Wt. (g)	N/A

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET
Particulate Matter M5/202

EPA Method 5/202

PAGE _____ OF _____

Client/Plant: PCS	Project #: 60402248.10	Date: 1-26-16	Operator(s): DM/LB
Location: Aitkin #5	Condition: Normal	Run #: 3	Duration (min): 72
Console#: N-44	CF (Yd): 1.0266	$\Delta H_@$: 1.928	Cp: 0.84
K-Factor: 3.82	P_{bar} ("Hg): 30.10	Height w.r.t. Barometer (ft): 700	P_{static} ("H_2O): -.22

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 18	Source Height (ft):	Duct Diameter ("):
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0	Vac. ("Hg): 9	Duct Width ("): --	Duct Length ("): --

Pitot Leak ✓ (>3"H_2O)	Initial +P: -P:	Final +P: -P:	Nozzle D1 (") Ø:
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:) Nozzle D2 (") ⊘:
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:) Nozzle D3 (") ⊖:
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:) Average Nozzle D ("):

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	2000	0	280.845	.24	.96	161	232	238	46	67	65	69	3
2		3	282.8	.27	1.0	159	239	248	45	68	67	72	3
3		6	284.0	.28	1.1	157	244	246	64	69	66	69	3
4		9	285.9	.27	1.0	158	258	259	64	68	67	69	3
5		12	287.6	.28	1.0	159	261	257	65	67	66	69	4
6		15	289.2	.27	1.0	160	266	253	64	67	68	72	4
7		18	291.2	.29	1.1	[illegible]	[illegible]	260	59	67	72	75	4
8		21	292.3	.30	1.1	161	263	253	59	68	74	78	4
9		24	294.0	.32	1.2	160	258	255	58	68	76	78	5
10		27	295.3	.35	1.3	156	262	255	56	69	74	78	5
11		30	297.1	.36	1.4	161	259	257	55	68	75	79	5
12		33	299.3	.37	1.4	159	260	256	56	69	74	79	5
STOP		36	300.569				PORT CHANGE						
B1		36	300.569	.35	1.3	161	258	251	58	70	72	76	5
2		39	302.4	.40	1.5	160	253	252	56	70	73	78	5
3		42	304.4	.39	1.5	161	253	254	61	74	72	78	5
4		45	306.5	.39	1.5	162	256	261	62	71	74	80	5
5		48	308.2	.38	1.5	159	261	257	64	69	71	78	5
6		51	310.2	.36	1.4	162	263	253	63	68	69	77	5
7		54	312.1	.37	1.4	160	258	261	65	68	70	75	5
8		57	314.1	.29	1.1	157	258	252	65	67	69	76	4
9		60	315.7	.26	.9	157	261	253	62	71	70	77	4
10		63	316.8	.27	1.0	157	260	252	61	73	70	76	3
11		66	318.8	.25	.96	159	266	257	61	75	69	75	3
12		69	320.2	.26	.99	160	259	251	62	74	70	76	3
END	2114	72	321.880										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60602648.10	Date: 1-26-16
Location: Cal #5	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	485.7	893.9	
2	MT	0	MGS	652.3	661.5	
3	Water	100	MGS	608.8	611.5	
4	Silica Gel	350	MGS	910.8	926.1	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14129	Tare Wt. (g)	0.37262
	ID#:		Tare Wt. (g)	
	ID#:	0116-101	Tare Wt. (g)	N/A

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

A-6 Calciner No. 6

PCS Phosphate Operations - Stack Test Results

Green indicates hard entry

Test Information

Location	Calciner No. 6
Product	Single Float Calcined Rock
Source	WESP
Stack ID No	206
Start Date	1/27/2016
Pollutant	Particulate
Method	5/202

Production Data

Date	1/27/2016	1/27/2016	1/28/2016
Feed Rate, Wet, TPH (During Test)	67.0	67.0	67.0
Bulk Moisture of Rock (Lab Analyses)	12.30%	12.30%	12.30%
Rock Feed Rate Dry, TPH	58.8	58.8	58.8
Lbs. Coal/Ton of Dry Feed	46.71	46.71	46.71
Coal Feed, TPH	1.37	1.37	1.37
Process Weight Rate, TPH	60.1	60.1	60.1
Loss On Ignition	2.98%	2.98%	2.98%
Production Rate During Test, TPH Product	57.0	57.0	57.0

Test Parameters/Conditions

	Run 1	Run 2	Run 3	Average
Time of Start	12:58	17:40	09:55	N/A
Time of Finish	16:20	18:54	10:31	N/A

Stack Gas Flow Rate Calculations

Stack Flow Rate, DSCFM	40,293	38,204	36,670	38,389
Sample Volume (DSCF)	43.216	40.997	40.113	41.442

Condensable

Particulate Determination, Inorganic Fraction

	Run 1	Run 2	Run 3	Average
Net Sample Weight, mg	7.74	5.57	9.50	N/A

Condensable

Particulate Determination, Organic Fraction

Net Sample Weight, mg	1.71	0.88	1.21	N/A
Train Blank, mg		2.30		N/A
CPM, mg/DSCF	0.1724	0.1085	0.2171	0.1660

Particulate Determination, Filterable

Beaker Final Weight, mg	0.23	0.20	0.28	N/A
Final Filter Weight, mg	8.84	37.07	14.19	N/A
Net Sample Weight, mg	9.07	37.27	14.47	N/A
Mg Particulate/DSCF	0.2099	0.9091	0.3607	0.4932
Mg Particulate/DSCF, Averaged for Wash Cycle Procedures				0.3165
grams/DSCM	0.0074	0.0321	0.0127	0.0174

Total Particulate Determination

PM Emission Rate, Lbs./Hr - Filterable	1.12	4.59	1.75	2.49
PM Emission Rate, Lbs./Hr - Condensable-Inorganic	0.95	0.69	1.15	0.93
PM Emission Rate, Lbs./Hr - Condensable-Organic	0.21	0.11	0.15	0.16
PM Emission Rate, Lbs./Hr -Total Condensable (corrected with train blank)	0.92	0.55	1.05	0.84
PM Emission Rate, Lbs./Hr - Total Particulate	2.04	5.14	2.80	3.33
Average Daily PM Emission Rate, Lbs./Hr - Filterable				1.592
Average Daily PM Emission Rate, Lbs./Hr -Condensible				0.964
Average Daily PM Emission Rate, Lbs./Hr - Total Particulate				2.556
PM Emission Rate, Lbs./Day				61.352
PM Emission Rate, grams/dscm				0.0112
PM Emission Rate, grains/dscf				0.005
Allowable PM Rate, grain/dscf				0.080

Data For Avg Daily Emission Rate Calculation (inputs in red cells only)

Total PM lbs/hr

Total PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	5.14
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Total PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	2.42

Filterable PM lbs/hr

Filterable PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	4.59
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	1.43

Condensible PM lbs/hr

Condensible PM lbs/hr Run with wash (enter cell address) ($E_{s)}$	0.55
Ave Hrs washing per 24 Hrs (S)	0.4167
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Condensible PM lbs/hr Avg of two non-wash runs (enter cell addresses)(E_N)	0.99

PM Emission rate g/dscm

Filterable PM g/dscm Run with wash (enter cell address) ($E_{s)}$	0.03
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM g/dscm Avg of two non-wash runs (enter cell addresses)(E_N)	0.01

PM Emission rate mg/dscf

Filterable PM mg/dscf Run with wash (enter cell address) ($E_{s)}$	0.91
Ave Hrs washing per 24 Hrs (S)	0.42
Run Time, Hours	1.20
Wash Time during test in hours (A)	0.42
Run Time During test not Washing in hours (B)	0.78
Filterable PM mg/dscf Avg of two non-wash runs (enter cell addresses)(E_N)	0.29

***Water Wash Performed on Run 2**

(R=24hrs)

$E_{avg} = E_s S\,(A+B)/AR) + E_N\,(((R-S)/R)-(BS/AR))$

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 6**
Condition	**Normal**
Sample Type:	**Method5/202**

Run Number: / Date:	1 27-Jan-16	2 27-Jan-16	3 28-Jan-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	29.99	30.03	29.89	29.97
Absolute Stack Pressure (in H2O)	29.97	30.01	29.87	29.95
Stack Static Pressure (in H2O)	-0.24	-0.24	-0.24	-0.24
Average Stack Temperature (°F)	147.3	150.2	151.8	149.8
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	41.374	39.099	38.693	39.722
Average Meter Pressure (in H2O)	1.12	1.03	1.00	1.05
Average Meter Temperature (°F)	45.2	43.8	47.1	45.4
Moisture Collected (g)	337.3	260.2	388.8	328.8
Carbon Dioxide Concentration (%V)	5.4	7.9	8.1	7.1
Oxygen Concentration (%V)	13.6	13.5	13.4	13.5
Nitrogen Concentration (%V)	81.0	78.6	78.5	79.4
Dry Gas Meter Factor (γ_δ)	0.9943	0.9943	0.9943	0.9943
Nozzle Diameter (in)	0.277	0.277	0.277	0.277
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.600	0.569	0.557	0.576
Standard Metered Volume (dscf)	43.216	40.997	40.113	41.442
Standard Metered Volume (dscm)	1.224	1.161	1.136	1.174
Stack Moisture (%V)	26.9	23.0	31.4	27.1
Saturated Moisture (%V)	23.4	25.2	26.0	24.9
Mole Fraction Dry Stack Gas	0.766	0.770	0.740	0.758
Dry Molecular Weight	29.41	29.81	29.83	29.68
Wet Molecular Weight	26.73	27.09	26.76	26.86
Average SQRT of Delta P	0.57	0.54	0.54	0.55
Stack Gas Velocity (fps)	35.6	33.7	33.9	34.4
Stack Gas Velocity (mps)	10.9	10.3	10.3	10.5
Volumetric Flow Rate (acfm)	60429	57188	57492	58370
Volumetric Flow Rate (acmm)	1711	1620	1628	1653
Volumetric Flow Rate (dscfm)	40293	38204	36670	38389
Volumetric Flow Rate (dscmm)	1141	1082	1039	1087
Percent Isokinetic	100.9	101.0	103.0	101.6
Post Test Meter QA (γ_{qa})	0.9934	0.9993	1.0030	0.9986

Enter data in unshaded areas.

Sample Type	Method5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 6
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	30.09

Date	1/27/2016
Operator	DM/LB
Run Number	1
K Factor	3.45
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.279
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.277

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	485.8	746.1	260.3
Impinger 2	547.9	641.6	93.7
Impinger 3	732.4	697.4	-35.0
Impinger 4	894.0	912.3	18.3
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			337.3
Pitot Tube ID			8-4
Saturated Percent Moisture		23.44	Standard
Calculated Percent Moisture		26.90	Volume (dscf)
Isokinetic %		100.9	43.2

O2/CO2 Method 3A

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	5.4	13.6	
Replicate 2			
Replicate 3			
Average	5.4	13.6	81.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	12:58:00	849.921	0.35	1.20	151	47	50
A2	3	13:01:00	852.700	0.27	0.93	145	48	52
A3	6	13:04:00	854.100	0.25	0.86	141	48	52
A4	9	13:07:00	855.900	0.26	0.90	143	48	53
A5	12	13:10:00	857.300	0.25	0.86	142	48	54
A6	15	14:07:00	858.700	0.28	0.97	155	43	45
A7	18	14:10:00	860.300	0.32	1.10	157	42	46
A8	21	14:13:00	862.800	0.37	1.30	143	42	45
A9	24	14:16:00	864.200	0.38	1.30	155	42	45
A10	27	14:19:00	866.100	0.39	1.30	143	42	46
A11	30	14:22:00	867.600	0.36	1.20	154	41	46
A12	33	14:25:00	869.400	0.38	1.30	139	42	47
STOP	36	14:28:00	871.215					
B1	36	14:32:00	871.215	0.42	1.40	146	41	45
B2	39	14:35:00	873.500	0.35	1.20	143	42	47
B3	42	14:38:00	875.000	0.32	1.10	147	42	47
B4	45	14:41:00	876.600	0.43	1.50	146	42	48
B5	48	14:44:00	879.100	0.30	1.00	135	41	47
B6	51	14:47:00	880.400	0.30	1.00	151	42	47
B7	54	14:50:00	882.000	0.35	1.20	153	41	47
B8	57	14:53:00	883.400	0.32	1.10	157	41	46
B9	60	16:08:00	885.000	0.34	1.20	152	42	46
B10	63	16:11:00	886.800	0.31	1.00	146	40	45
B11	66	16:14:00	888.300	0.28	0.97	137	41	46
B12	69	16:17:00	889.700	0.26	0.90	154	41	47
	72	16:20:00	891.295					

Enter data in unshaded areas.

Sample Type	Method5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 6
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	30.13

Date	1/27/2016
Operator	DM/LB
Run Number	2
K Factor	3.45
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.279
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.277

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	502.9	678.9	176.0
Impinger 2	594.1	654.9	60.8
Impinger 3	706.0	710.5	4.5
Impinger 4	937.2	956.1	18.9
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			260.2
Pitot Tube ID			8-4
Saturated Percent Moisture		25.23	Standard
Calculated Percent Moisture		23.03	Volume (dscf)
Isokinetic %		101.0	41.0

O2/CO2 Method 3A

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.9	13.5	
Replicate 2			
Replicate 3			
Average	7.9	13.5	78.6

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	17:40:00	894.611	0.37	1.30	157	42	45
B2	3	17:43:00	896.500	0.34	1.10	153	42	46
B3	6	17:46:00	897.900	0.32	1.10	156	41	46
B4	9	17:49:00	899.700	0.35	1.20	155	42	46
B5	12	17:52:00	901.400	0.37	1.30	157	42	47
B6	15	17:55:00	902.900	0.35	1.20	157	42	48
B7	18	17:58:00	904.800	0.36	1.30	158	42	48
B8	21	18:01:00	906.700	0.27	0.93	158	42	48
B9	24	18:04:00	908.100	0.33	1.10	156	42	49
B10	27	18:07:00	909.700	0.26	0.90	144	42	49
B11	30	18:10:00	911.400	0.31	1.00	151	43	48
B12	33	18:13:00	912.900	0.31	1.00	144	42	49
STOP	36	18:16:00	914.445					
A1	36	18:18:00	914.445	0.32	1.10	155	43	47
A2	39	18:21:00	916.300	0.41	1.40	145	42	46
A3	42	18:24:00	918.000	0.37	1.30	155	41	46
A4	45	18:27:00	919.900	0.37	1.30	147	41	48
A5	48	18:30:00	921.600	0.30	1.00	155	41	45
A6	51	18:33:00	923.600	0.20	0.70	143	40	45
A7	54	18:36:00	925.300	0.22	0.76	141	40	45
A8	57	18:39:00	926.600	0.20	0.69	147	40	44
A9	60	18:42:00	928.000	0.18	0.61	154	40	45
A10	63	18:45:00	929.300	0.23	0.79	162	41	45
A11	66	18:48:00	930.800	0.25	0.86	129	40	43
A12	69	18:51:00	931.300	0.16	0.85	126	39	42
	72	18:54:00	933.710					

Enter data in unshaded areas.

Sample Type	Method5/202
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 6
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	29.99

Date	1/28/2016
Operator	DM/LB
Run Number	3
K Factor	3.45
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.279
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.277

O2/CO2 Method 3A

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	8.1	13.4	
Replicate 2			
Replicate 3			
Average	8.1	13.4	78.5

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	487.2	754.3	267.1
Impinger 2	654.8	743.2	88.4
Impinger 3	610.9	625.2	14.3
Impinger 4	877.5	896.5	19.0
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			388.8
Pitot Tube ID			8-4
Saturated Percent Moisture		25.98	Standard
Calculated Percent Moisture		31.37	Volume (dscf)
Isokinetic %		103.0	40.1

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	9:55:00	934.498	0.23	0.79	144	40	43
A2	3	9:58:00	935.900	0.23	0.79	142	40	44
A3	6	10:01:00	937.300	0.22	0.76	143	40	45
A4	9	10:04:00	938.100	0.23	0.79	144	41	46
A5	12	10:07:00	940.300	0.27	0.93	153	41	47
A6	15	10:10:00	941.800	0.25	0.86	145	42	48
A7	18	10:13:00	943.100	0.28	0.97	154	41	47
A8	21	10:16:00	944.700	0.33	1.10	146	41	48
A9	24	10:19:00	946.400	0.36	1.20	151	42	49
A10	27	10:22:00	948.100	0.35	1.20	154	42	49
A11	30	10:25:00	949.700	0.36	1.20	156	43	50
A12	33	10:28:00	951.500	0.33	1.10	149	43	51
STOP	36	10:31:00	953.185					
B1	36	9:55:00	953.185	0.30	1.00	147	44	50
B2	39	9:58:00	954.800	0.31	1.10	154	44	51
B3	42	10:01:00	956.700	0.28	0.97	155	44	52
B4	45	10:04:00	958.300	0.28	0.97	156	45	53
B5	48	10:07:00	959.800	0.29	1.00	157	46	53
B6	51	10:10:00	961.400	0.33	1.10	158	46	54
B7	54	10:13:00	963.200	0.34	1.20	160	47	54
B8	57	10:16:00	964.800	0.32	1.10	158	47	55
B9	60	10:19:00	966.500	0.31	1.10	154	47	55
B10	63	10:22:00	968.400	0.25	0.86	155	48	56
B11	66	10:25:00	969.900	0.27	0.93	153	48	56
B12	69	10:28:00	971.500	0.30	1.00	155	49	56
	72	10:31:00	973.191					

Emissions Test Run Summary

Facility:	**PCS Phosphate**
Location:	**Calciner # 6**
Condition	**Normal**
Sample Type:	**Method 13B**

Run Number: / Date:	1 26-Jan-16	2 26-Jan-16	3 26-Jan-16	Average
Total Sampling Time (min)	72.0	72.0	72.0	72.0
Corrected Barometric Pressure (in Hg)	30.08	30.06	30.07	30.07
Absolute Stack Pressure (in H2O)	30.06	30.04	30.05	30.05
Stack Static Pressure (in H2O)	-0.24	-0.24	-0.24	-0.24
Average Stack Temperature (°F	154.0	154.7	154.5	154.4
Stack Area (sq in)	4072	4072	4072	4072
Actual Meter Volume (cu ft)	41.568	39.089	42.620	41.092
Average Meter Pressure (in H2O)	1.16	1.03	1.21	1.13
Average Meter Temperature (°F	73.7	67.5	64.8	68.7
Moisture Collected (g)	418.6	366.5	392.3	392.5
Carbon Dioxide Concentration (%V)	7.1	7.1	7.1	7.1
Oxygen Concentration (%V)	13.5	13.5	13.5	13.5
Nitrogen Concentration (%V)	79.4	79.4	79.4	79.4
Dry Gas Meter Factor (γ_δ)	0.9943	0.9943	0.9943	0.9943
Nozzle Diameter (in)	0.277	0.277	0.277	0.277
Pitot Constant	0.84	0.84	0.84	0.84
Average Sampling Rate (dscfm)	0.573	0.544	0.597	0.571
Standard Metered Volume (dscf)	41.227	39.184	42.976	41.129
Standard Metered Volume (dscm)	1.167	1.110	1.217	1.165
Stack Moisture (%V)	32.4	30.6	30.1	31.0
Saturated Moisture (%V)	27.1	27.8	27.8	27.6
Mole Fraction Dry Stack Gas	0.729	0.722	0.722	0.724
Dry Molecular Weight	29.68	29.68	29.68	29.68
Wet Molecular Weight	26.51	26.43	26.44	26.46
Average SQRT of Delta P	0.58	0.55	0.59	0.57
Stack Gas Velocity (fps)	36.4	34.6	37.4	36.1
Stack Gas Velocity (mps)	11.1	10.5	11.4	11.0
Volumetric Flow Rate (acfm)	61687	58660	63385	61244
Volumetric Flow Rate (acmm)	1747	1661	1795	1734
Volumetric Flow Rate (dscfm)	38851	36525	39502	38293
Volumetric Flow Rate (dscmm)	1100	1034	1119	1084
Percent Isokinetic	99.9	101.0	102.2	101.0
Post Test Meter QA (γ_{qa})	1.0287	1.0291	1.0173	1.0251

Fluoride Emission Rate Calculations

				Average
Orion 901 Meter Reading, ppm	0.199	0.169	0.264	N/A
Liquid Sample Volume, ml	1000	1000	1000	N/A
Sample Aliquot	10	10	10	N/A
Sample Dilution	10	10	10	N/A
Total Fluoride, mg	0.1990	0.1690	0.2640	0.2107
Fluoride Concentration, mg/DSCF	0.0048	0.0043	0.0061	0.0051
Fluoride Emissions, lbs F/hr	0.0248	0.0208	0.0321	0.0259
Rock Feed (Wet TPH)	67.86	67.86	67.86	67.9
Fluoride Emissions, lbs F/Ton Rock Feed	0.0004	0.0003	0.0005	0.0004

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 6
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	30.18

Date	1/26/2016
Operator	WL/BM
Run Number	1
K Factor	3.45
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.279
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.277

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.1	13.5	
Replicate 2			
Replicate 3			
Average	7.1	13.5	79.4

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	772.1	990.4	218.3
Impinger 2	698.3	881.3	183.0
Impinger 3	638.7	644.7	6.0
Impinger 4	904.1	915.4	11.3
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			418.6
Pitot Tube ID			6-7
Saturated Percent Moisture		27.11	Standard
Calculated Percent Moisture		32.37	Volume (dscf)
Isokinetic %		99.9	41.2

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
A1	0	13:55:00	718.349	0.29	1.00	160	71	71
A2	3	13:58:00	720.040	0.31	1.06	158	71	70
A3	6	14:01:00	721.670	0.25	0.86	159	71	70
A4	9	14:04:00	723.240	0.34	1.17	149	72	70
A5	12	14:07:00	724.840	0.30	1.03	161	73	70
A6	15	14:10:00	726.470	0.35	1.20	160	74	70
A7	18	14:13:00	728.260	0.38	1.31	148	75	70
A8	21	14:16:00	730.060	0.45	1.55	147	76	71
A9	24	14:19:00	731.880	0.32	1.10	144	76	70
A10	27	14:22:00	733.650	0.37	1.27	143	77	71
A11	30	14:25:00	735.480	0.34	1.17	157	77	71
A12	33	14:28:00	737.310	0.34	1.17	155	77	71
STOP	36	14:31:00	739.110					
B1	36	14:52:00	739.110	0.38	1.31	161	76	72
B2	39	14:55:00	740.920	0.40	1.38	158	77	72
B3	42	14:58:00	742.770	0.42	1.62	161	78	72
B4	45	15:01:00	744.690	0.28	0.96	153	78	72
B5	48	15:04:00	746.370	0.37	1.27	161	78	72
B6	51	15:07:00	748.180	0.32	1.10	154	78	72
B7	54	15:10:00	749.920	0.28	0.96	149	78	72
B8	57	15:13:00	751.570	0.32	1.10	150	78	73
B9	60	15:16:00	753.250	0.29	1.00	158	78	72
B10	63	15:19:00	754.880	0.34	1.17	145	78	73
B11	66	15:22:00	756.500	0.32	1.10	151	78	73
B12	69	15:25:00	758.330	0.27	0.93	153	78	73
	72	15:28:00	759.917					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 6
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	30.16

Date	1/26/2016
Operator	WL/BM
Run Number	2
K Factor	3.45
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.275
Nozzle ID 2 (in)	0.279
Nozzle ID 3 (in)	0.276
Nozzle ID (in)	0.277

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	637.0	907.2	270.2
Impinger 2	722.8	805.0	82.2
Impinger 3	654.1	658.3	4.2
Impinger 4	906.5	916.4	9.9
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			366.5
Pitot Tube ID			6-7
Saturated Percent Moisture		27.80	Standard
Calculated Percent Moisture		30.60	Volume (dscf)
Isokinetic %		101.0	39.2

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.1	13.5	
Replicate 2			
Replicate 3			
Average	7.1	13.5	79.4

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft³)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	16:50:00	760.221	0.34	1.17	150	69	70
B2	3	16:53:00	761.980	0.30	1.03	160	69	70
B3	6	16:56:00	763.570	0.32	1.10	154	69	68
B4	9	16:59:00	765.710	0.37	1.27	151	69	68
B5	12	17:02:00	767.000	0.37	1.27	150	69	68
B6	15	17:05:00	768.720	0.32	1.10	160	69	67
B7	18	17:08:00	770.380	0.29	1.00	158	69	67
B8	21	17:11:00	772.010	0.27	0.93	148	69	66
B9	24	17:14:00	773.620	0.28	0.96	151	69	67
B10	27	17:17:00	775.230	0.30	1.03	152	69	66
B11	30	17:20:00	776.840	0.29	1.00	143	69	66
B12	33	17:23:00	778.460	0.27	0.93	153	69	66
STOP	36	17:26:00	780.085					
A1	36	16:49:00	780.085	0.31	1.06	151	68	66
A2	39	16:52:00	781.760	0.32	1.10	158	68	66
A3	42	16:55:00	783.310	0.32	1.10	161	68	66
A4	45	16:58:00	785.020	0.28	0.96	150	68	66
A5	48	17:01:00	786.670	0.29	1.00	161	68	66
A6	51	17:04:00	788.210	0.36	1.24	156	68	66
A7	54	17:07:00	789.870	0.25	0.86	160	68	66
A8	57	17:10:00	791.460	0.26	0.89	159	67	66
A9	60	17:13:00	792.930	0.27	0.93	161	67	66
A10	63	17:16:00	794.480	0.27	0.93	154	67	66
A11	66	17:19:00	796.170	0.28	0.96	154	67	66
A12	69	17:22:00	797.368	0.28	0.96	158	67	66
	72	17:25:00	799.310					

Enter data in unshaded areas.

Sample Type	Method 13B
Client/Plant	PCS Phosphate
Project Number	60402248
Sampling Location	Calciner # 6
Condition	Normal
Meter Box Number	N-45
Meter Factor (γ_d)	0.9943
Minutes per Point	3.0
Barometric Pressure	30.17

Date	1/26/2016
Operator	WL/BM
Run Number	3
K Factor	3.45
Meter $\Delta H_@$	1.7992
Pitot Constant	0.84
Height of Location (ft)	100
Static Pressure (Ps)	-0.24
Stack Geometry (R or C)?	c
Stack Diameter (in)	72.0
Stack Width (If Rectangle)	
Nozzle ID 1 (in)	0.278
Nozzle ID 2 (in)	0.276
Nozzle ID 3 (in)	0.277
Nozzle ID (in)	0.277

O2/CO2 Method Per historical Data

	CO2 Percent	O2 Percent	N2 Percent
Replicate 1	7.1	13.5	
Replicate 2			
Replicate 3			
Average	7.1	13.5	79.4

Impinger Weights (g)

	Initial	Final	Net
Impinger 1	755.3	999.3	244.0
Impinger 2	674.5	807.1	132.6
Impinger 3	641.5	646.6	5.1
Impinger 4	915.3	925.9	10.6
Impinger 5			0.0
Impinger 6			0.0
Impinger 7			0.0
Impinger 8			0.0
Moisture Collected (g)			392.3
Pitot Tube ID			6-7
Saturated Percent Moisture		27.79	Standard
Calculated Percent Moisture		30.09	Volume (dscf)
Isokinetic %		102.2	43.0

Traverse Point Location	Sampling Time (min)	Clock Time (24 hr)	Dry Gas Meter Reading Vm (ft^3)	Velocity Head (ΔP) (in H2O)	Orifice Pressure Diff (ΔH) (in H2O)	Stack Temp Ts (F)	Dry Gas Meter Temperature Tm in (F)	Dry Gas Meter Temperature Tm out (F)
B1	0	19:05:00	799.610	0.29	1.00	152	62	63
B2	3	19:08:00	801.350	0.30	1.03	141	62	62
B3	6	19:11:00	802.980	0.31	1.06	159	63	62
B4	9	19:14:00	804.650	0.34	1.17	160	64	62
B5	12	19:17:00	806.370	0.42	1.44	159	64	61
B6	15	19:20:00	808.260	0.34	1.17	160	66	62
B7	18	19:23:00	801.070	0.37	1.27	152	66	61
B8	21	19:26:00	811.850	0.37	1.27	160	67	62
B9	24	19:29:00	813.660	0.35	1.20	158	68	62
B10	27	19:32:00	815.870	0.38	1.31	157	68	62
B11	30	19:35:00	817.270	0.38	1.31	155	68	62
B12	33	19:38:00	819.260	0.38	1.31	152	68	62
STOP	36	19:41:00	821.012					
A1	36	19:45:00	821.012	0.39	1.34	145	66	62
A2	39	19:48:00	822.870	0.37	1.27	156	68	62
A3	42	19:51:00	824.680	0.40	1.38	144	68	62
A4	45	19:54:00	826.570	0.38	1.31	149	69	63
A5	48	19:57:00	828.450	0.36	1.24	158	69	62
A6	51	20:00:00	830.270	0.41	1.41	150	69	63
A7	54	20:03:00	832.140	0.34	1.17	156	70	63
A8	57	20:06:00	833.880	0.31	1.06	151	70	63
A9	60	20:09:00	835.560	0.28	0.96	157	70	63
A10	63	20:12:00	837.210	0.38	1.31	157	70	63
A11	66	20:15:00	838.990	0.31	1.06	159	70	63
A12	69	20:18:00	840.670	0.27	0.93	160	70	63
	72	20:21:00	842.230					

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EPA Method 30B Emission Results

PCS Phosphate
Calciner #6
Mercury
Emission Calculations

O_2 Correction Basis: 3

Pollutant: Mercury

Run	Total Hg Catch ng	Sample Volume dscm	Hg Concentration mg/dscm	Hg Concentration ppmV	Oxygen %	Hg Concentration mg/dscm @ 3%	Flow Rate dscfm
1	3009	0.051	0.0593	0.0071	13.60	0.145	44,433
2	2828	0.050	0.0562	0.0067	13.46	0.135	44,579
3	3016	0.051	0.0587	0.0070	13.43	0.141	43,830
AVERAGE	**2951**	**0.051**	**0.0581**	**0.0070**	**13.50**	**0.140**	**44,281**

Method 2 Velocity Traverse

Run Number	1	Date	2/19/2016
Client/Plant	PCS	Operator	DM/WL
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #6	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.26	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.59	Corrected Baro. Pressure	30.5
		Abs. Stack Press. (in. Hg)	30.47

Assumed	CO2 Percent	O2 Percent	
Replicate 1	5.43	13.60	
Replicate 2			
Replicate 3			N2 Percent
Average	5.4	13.6	81.0

Moisture By: Saturation

Saturated Percent Moisture	25.47
Calculated Percent Moisture	25.47
Mole Frac of Dry Stack Gas	0.745
Average MW of Dry Gas	29.41
Average MW of Wet Gas	26.51

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.41	139	0.640	39.6
2	0.42	140	0.648	40.1
3	0.36	144	0.600	37.3
4	0.35	146	0.592	36.8
5	0.42	148	0.648	40.4
6	0.40	150	0.632	39.5
7	0.38	152	0.616	38.5
8	0.43	152	0.656	41.0
9	0.39	152	0.624	39.0
10	0.44	152	0.663	41.5
11	0.38	152	0.616	38.5
12	0.26	151	0.510	31.8
B1	0.43	151	0.656	41.0
2	0.44	151	0.663	41.4
3	0.43	152	0.656	41.0
4	0.45	152	0.671	41.9
5	0.43	154	0.656	41.1
6	0.40	155	0.632	39.6
7	0.53	155	0.728	45.6
8	0.44	155	0.663	41.6
9	0.51	155	0.714	44.8
10	0.49	156	0.700	43.9
11	0.32	157	0.566	35.5
12	0.35	155	0.592	37.1
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		151.08	0.64	39.94

Act Volumetric Flow Rate (acfm)	67749
Std. Volumetric Flow Rate (scfm)	59615
Dry Volumetric Flow Rate (dscfm)	44433

Method 2 Velocity Traverse

Run Number	2	Date	2/19/2016
Client/Plant	PCS	Operator	DM/WL
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #6	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.26	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.54	Corrected Baro. Pressure	30.4
		Abs. Stack Press. (in. Hg)	30.42

Assumed	CO2 Percent	O2 Percent	
Replicate 1	7.92	13.46	
Replicate 2			
Replicate 3			N2 Percent
Average	7.9	13.5	78.6

Moisture By: Saturation

Saturated Percent Moisture	23.68
Calculated Percent Moisture	23.68
Mole Frac of Dry Stack Gas	0.763
Average MW of Dry Gas	29.81
Average MW of Wet Gas	27.01

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.44	137	0.663	40.6
2	0.46	139	0.678	41.6
3	0.45	140	0.671	41.2
4	0.40	141	0.632	38.8
5	0.40	141	0.632	38.8
6	0.37	142	0.608	37.4
7	0.35	142	0.592	36.4
8	0.34	142	0.583	35.8
9	0.35	143	0.592	36.4
10	0.34	146	0.583	36.0
11	0.29	149	0.539	33.3
12	0.27	150	0.520	32.2
B1	0.42	154	0.648	40.2
2	0.39	154	0.624	38.8
3	0.38	155	0.616	38.3
4	0.40	155	0.632	39.3
5	0.42	155	0.648	40.3
6	0.45	156	0.671	41.7
7	0.48	156	0.693	43.1
8	0.52	156	0.721	44.8
9	0.53	156	0.728	45.3
10	0.50	156	0.707	44.0
11	0.42	156	0.648	40.3
12	0.28	152	0.529	32.8
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		148.88	0.63	39.05

Act Volumetric Flow Rate (acfm)	66249
Std. Volumetric Flow Rate (scfm)	58411
Dry Volumetric Flow Rate (dscfm)	44579

Method 2 Velocity Traverse

Run Number	3	Date	2/19/2016
Client/Plant	PCS	Operator	DM/WL
Project Number	60402248.1	Pitot Constant	0.84
Sampling Location	Calciner #6	Stack Geometry (R or C)?	C
Condition	Normal	Stack Diameter (in)	72.0
Static Pressure (Ps)	-0.26	Stack Width (If Rectangle)	
Location Height (ft)	100	Stack Area (sq. in.)	4071.5
Barometric Pressure	30.51	Corrected Baro. Pressure	30.4
		Abs. Stack Press. (in. Hg)	30.39

Assumed	CO2 Percent	O2 Percent	
Replicate 1	8.07	13.43	
Replicate 2			
Replicate 3			N2 Percent
Average	8.1	13.4	78.5

Moisture By: Saturation

Saturated Percent Moisture	24.30
Calculated Percent Moisture	24.30
Mole Frac of Dry Stack Gas	0.757
Average MW of Dry Gas	29.83
Average MW of Wet Gas	26.95

Traverse Point Location	Velocity Head (ΔP) (in H2O)	Stack Temp Ts (F)	Square Root of ΔP SQRT(ΔP)	Stack Gas Velocity (fps)
A1	0.41	137	0.640	39.3
2	0.40	137	0.632	38.8
3	0.38	138	0.616	37.8
4	0.38	138	0.616	37.8
5	0.40	142	0.632	38.9
6	0.39	145	0.624	38.5
7	0.37	146	0.608	37.6
8	0.35	148	0.592	36.6
9	0.33	149	0.574	35.6
10	0.32	150	0.566	35.1
11	0.31	152	0.557	34.6
12	0.29	151	0.539	33.4
B1	0.46	152	0.678	42.1
2	0.51	153	0.714	44.4
3	0.49	154	0.700	43.5
4	0.48	154	0.693	43.1
5	0.46	155	0.678	42.2
6	0.46	155	0.678	42.2
7	0.42	156	0.650	40.5
8	0.40	156	0.632	39.4
9	0.37	156	0.608	37.9
10	0.39	156	0.624	38.9
11	0.42	152	0.648	40.2
12	0.27	148	0.520	32.1
		Average Stack Temp	Average SQRT ΔP	Average Velocity
		149.17	0.63	38.77

Act Volumetric Flow Rate (acfm)	65765
Std. Volumetric Flow Rate (scfm)	57900
Dry Volumetric Flow Rate (dscfm)	43830

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METHOD 30B

Run No. 1

Date	2/19/2016		Sorbent Trap Number	OL211412	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.018	
Location	Calciner #6		Nozzle ID (inches)		DGM Cal Factor (Y)	1.018	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	23	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	21	Barometric Pres. (" Hg)	30.49	O2/CO2 Method	Method 3A	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	11:30:00	0.000		0.75	152	297	44	32	251	2
	5	11:35	3.65		0.75	152	312	44	32	254	2
	10	11:40	7.29		0.75	152	297	44	31	261	2
	15	11:45	11.22		0.75	152	271	45	32	257	2
	20	11:50	15.20		0.75	152	249	45	32	257	2
	25	11:55	19.40		0.75	152	251	45	31	257	2
	30	12:00	23.31		0.75	152	256	46	32	256	2
	35	12:05	27.19		0.75	152	278	48	31	259	2
	40	12:10	31.04		0.75	152	279	47	31	258	2
	45	12:15	34.90		0.75	152	268	47	31	259	2
	50	12:20	38.97		0.75	152	260	48	31	259	2
	55	12:25	43.12		0.75	155	267	48	31	257	2
	60	12:30	46.631		0.75	156	270	48	31	257	2
TOTAL			46.631	46.6310	0.75	153	273	46	31	257	2
Target Volume											
Spike Amount (ng)	2200										

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**50469.96245**	**50.4699624**

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METHOD 30B

Date	2/19/2016		Sorbent Trap Number	OL232760	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.028	
Location	Calciner #6		Nozzle ID (inches)		DGM Cal Factor (Y)	1.028	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	1	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	22	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	18	Barometric Pres. (" Hg)	30.49	O2/CO2 Method	Method 3A	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	11:30:00	0.000		0.75	152	297	45	32	251	3
	5	11:35	3.79		0.75	152	312	45	32	254	3
	10	11:40	7.60		0.75	152	297	45	31	261	3
	15	11:45	11.50		0.75	152	271	46	32	257	3
	20	11:50	15.44		0.75	152	249	46	32	257	3
	25	11:55	19.60		0.75	152	251	47	31	257	3
	30	12:00	23.53		0.75	152	256	48	32	256	3
	35	12:05	27.44		0.75	152	278	48	31	259	3
	40	12:10	31.26		0.75	152	279	48	31	258	3
	45	12:15	35.10		0.75	152	268	48	31	259	3
	50	12:20	39.21		0.75	152	260	49	31	259	3
	55	12:25	43.41		0.75	155	267	49	31	257	3
	60	12:30	46.773		0.75	156	270	49	31	257	3
TOTAL			46.773	46.773	0.75	153	273	47	31	257	3.00
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**51012.31402**	**51.012314**

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AECOM

METHOD 30B

Run No. 2

Date	2/19/2016		Sorbent Trap Number	OL211407	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.018	
Location	Calciner #6		Nozzle ID (inches)		DGM Cal Factor (Y)	1.018	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	20	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	16	Barometric Pres. (" Hg)	30.44	O2/CO2 Method	Method 3A	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	12:50:00	0.000		0.75	160	237	48	32	253	1
	5	12:55	4.46		0.75	163	260	48	32	253	1
	10	13:00	8.38		0.75	150	297	49	31	255	1
	15	13:05	12.30		0.75	156	314	49	31	253	1
	20	13:10	15.96		0.75	166	300	49	32	258	1
	25	13:15	19.96		0.75	151	257	50	31	259	1
	30	13:20	24.13		0.75	156	240	50	31	257	1
	35	13:25	28.42		0.75	163	268	50	32	255	1
	40	13:30	32.00		0.75	164	301	51	31	256	1
	45	13:35	35.47		0.75	163	309	50	32	257	1
	50	13:40	39.04		0.75	162	270	51	32	262	1
	55	13:45	42.78		0.75	159	246	51	32	258	1
	60	13:50	46.778		0.75	149	252	51	32	253	1
TOTAL			46.7780	46.7780	0.75	159	273	50	32	256	1.00
Target Volume											
Spike Amount (ng)	2200										

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**50179.69175**	**50.1796918**

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AECOM

METHOD 30B

Date	2/19/2016		Sorbent Trap Number	OL2322890	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.028	
Location	Calciner #6		Nozzle ID (inches)		DGM Cal Factor (Y)	1.028	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	2	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	DM		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	25	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	14	Barometric Pres. (" Hg)	30.44	O2/CO2 Method	Method 3A	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
A1	0	12:50:00	0.000		0.75	160	237	51	32	253	3
	5	12:55	4.430		0.75	163	260	55	32	253	3
	10	13:00	8.220		0.75	150	297	52	31	255	2
	15	13:05	12.170		0.75	156	314	53	31	253	2
	20	13:10	15.840		0.75	166	300	52	32	258	2
	25	13:15	19.890		0.75	151	257	51	31	259	2
	30	13:20	24.080		0.75	156	240	53	31	257	2
	35	13:25	28.400		0.75	163	268	51	32	255	2
	40	13:30	32.010		0.75	164	301	54	31	256	2
	45	13:35	35.630		0.75	163	309	51	32	257	2
	50	13:40	39.230		0.75	162	270	52	32	262	2
	55	13:45	43.130		0.75	159	246	52	32	258	2
	60	13:50	46.831		0.75	149	252	52	32	253	2
TOTAL			46.831	46.831	0.75	159	273	52	32	256	2.15
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**50486.08703**	**50.486087**

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AECOM

METHOD 30B

Run No. 3

Date	2/19/2016		Sorbent Trap Number	OL211410	Meter Number	8002494	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.018	
Location	Calciner #6		Nozzle ID (inches)		DGM Cal Factor (Y)	1.018	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	3	A	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height			Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	22	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	18	Barometric Pres. (" Hg)	30.41	O2/CO2 Method	Method 3A	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:00:00	0.000		0.75	161	269	50	32	254	1
	5	14:05	4.650		0.75	154	297	51	32	256	1
	10	14:10	8.350		0.75	163	272	51	31	255	1
	15	14:15	12.800		0.75	163	279	51	31	256	1
	20	14:20	16.590		0.75	164	281	51	31	257	1
	25	14:25	20.570		0.75	163	284	51	31	259	1
	30	14:30	24.490		0.75	160	290	51	31	256	1
	35	14:35	28.520		0.75	160	286	51	31	256	1
	40	14:40	32.410		0.75	159	274	52	31	257	1
	45	14:45	36.270		0.75	158	278	52	31	258	1
	50	14:50	40.550		0.75	161	279	52	31	257	1
	55	14:55	44.500		0.75	160	280	52	31	257	1
	60	15:00	47.893		0.75	160	279	52	31	256	1
TOTAL			47.893	47.893	0.75	160	281	51	31	256	1.00
Target Volume											
Spike Amount (ng)	2200										

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**51170.61056**	**51.1706106**

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AECOM

METHOD 30B

Run No. 3

Date	2/19/2016		Sorbent Trap Number	OL235498	Meter Number	8002663	
Plant	PCS Phosphate		Probe Length & Type		Totalizer Cal Factor (Y)	1.028	
Location	Calciner #6		Nozzle ID (inches)		DGM Cal Factor (Y)	1.028	
Sample Type	30B		Probe Heat Set Point (F)		Stack Diameter	72	
Run Number/Side (A/B)	3	B	Tube Heat Set Point (F)		Assumed H_20 %		
Operator	WL		Minutes Per Point		K-factor		
Location Height	100		Ambient Temp. (F)		O2 %		
Initial Leak Check (L/min @ "Hg)	0.000	25	Static Pressure (" H_20)		CO2%		
Final Leak Check (L/min @ "Hg)	0.000	16	Barometric Pres. (" Hg)	30.41	O2/CO2 Method	Method 3A	

Diagram of Duct & Traverse Points

Single Point	Sampling Time (min)	Clock Time (min)	Digital Gas Meter Reading (L)	Mechanical Gas Meter Reading (m^3)	Meter Flow Rate (Lpm)	Stack Temp. (deg. F)	Trap Temp. (deg. F)	Meter Temp. (deg. F)	Chiller Temp. (deg. F)	Heated Line Temp. (deg. F)	Pump Vacuum (" Hg)
	0	14:00:00	0.000		0.75	161	269	52	32	254	2
	5	14:05	4.540		0.75	154	297	53	32	256	2
	10	14:10	8.250		0.75	163	272	53	31	255	2
	15	14:15	12.730		0.75	163	279	53	31	256	2
	20	14:20	16.460		0.75	164	281	53	31	257	2
	25	14:25	20.350		0.75	163	284	53	31	259	2
	30	14:30	24.270		0.75	160	290	53	31	256	2
	35	14:35	28.300		0.75	160	286	54	31	256	2
	40	14:40	32.420		0.75	159	274	54	31	257	2
	45	14:45	36.630		0.75	158	278	54	31	258	2
	50	14:50	40.510		0.75	161	279	54	31	257	2
	55	14:55	44.270		0.75	160	280	54	31	257	2
	60	15:00	48.017		0.75	160	279	54	31	256	2
TOTAL			48.017	48.017	0.75	160	281	53	31	256	2.00
Target Volume											
Spike Amount (ng)											

Comments:

Barometric Pressure corrected for elevation

	Mechanical	Totalizer
Total Volume (L)	**51597.33349**	**51.5973335**

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Calibration Error Test, Run 1 STRATA Version 3.2.112
Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6

	Reference Cylinder Numbers			
	Zero	Low-range	Mid-range	High-range
O2	CC96938		CC313420	CC102927
CO2	CC96938		CC313420	CC102927

Date/Time 02-19-2016 08:34:23 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Avg	-0.005	-0.024
Zero Error%	0.0%	0.1%
Low Ref Cyl		
Low Avg		
Low Error%		
Mid Ref Cyl	10.100	9.670
Mid Avg	10.058	9.586
Mid Error%	0.2%	0.4%
High Ref Cyl	19.260	20.760
High Avg	19.257	20.809
High Error%	0.0%	0.2%

Calibration Error Test End

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Initial System Bias Check, Run 1 STRATA Version 3.2.112
Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6

	Reference Cylinder Numbers Zero	Span
O2	CC96938	CC313420
CO2	CC96938	CC313420

Date/Time 02-19-2016 09:16:40 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	-0.005	-0.024
Zero Avg	0.041	0.121
Zero Bias%	0.2%	0.7%
Zero Drift%		
Span Ref Cyl	10.100	9.670
Span Cal	10.058	9.586
Span Avg	10.068	9.544
Span Bias%	0.0%	0.2%
Span Drift%		

System Bias Check End

Test Run 1 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-19-2016 11:31:14	13.676	5.363
02-19-2016 11:32:14	13.463	5.064
02-19-2016 11:33:13	14.138	4.214
02-19-2016 11:34:13	14.424	4.918
02-19-2016 11:35:13	13.530	5.323
02-19-2016 11:36:13	13.236	5.192
02-19-2016 11:37:14	13.372	5.348
02-19-2016 11:38:14	13.461	5.041
02-19-2016 11:39:14	13.260	5.432
02-19-2016 11:40:14	12.798	5.447
02-19-2016 11:41:14	13.316	5.160
02-19-2016 11:42:14	13.126	5.409
02-19-2016 11:43:13	13.044	5.452
02-19-2016 11:44:14	12.931	5.521
02-19-2016 11:45:13	13.046	5.443
02-19-2016 11:46:13	12.777	5.636
02-19-2016 11:47:13	13.146	5.133
02-19-2016 11:48:13	13.108	5.486
02-19-2016 11:49:13	13.246	5.043
02-19-2016 11:50:13	13.420	4.996
02-19-2016 11:51:13	13.456	5.038
02-19-2016 11:52:13	13.872	4.729
02-19-2016 11:53:14	13.919	4.882
02-19-2016 11:54:14	13.804	4.913
02-19-2016 11:55:14	13.792	4.830
02-19-2016 11:56:13	14.191	4.215
02-19-2016 11:57:14	14.385	4.613
02-19-2016 11:58:13	13.919	4.874
02-19-2016 11:59:13	13.743	4.712
02-19-2016 12:00:13	13.850	4.591
02-19-2016 12:01:13	14.060	4.601
02-19-2016 12:02:13	13.736	4.855
02-19-2016 12:03:13	13.457	5.182
02-19-2016 12:04:13	13.221	5.195
02-19-2016 12:05:13	13.193	5.397
02-19-2016 12:06:14	12.703	4.971
02-19-2016 12:07:14	13.493	5.136
02-19-2016 12:08:14	13.247	5.520
02-19-2016 12:09:14	13.316	5.209
02-19-2016 12:10:13	13.696	5.115
02-19-2016 12:11:13	13.637	5.478
02-19-2016 12:12:13	13.720	5.178
02-19-2016 12:13:13	13.921	5.400
02-19-2016 12:14:14	13.932	5.455
02-19-2016 12:15:14	13.606	5.751
02-19-2016 12:16:14	13.708	5.392
02-19-2016 12:17:14	13.988	5.752
02-19-2016 12:18:14	13.741	5.765
02-19-2016 12:19:14	13.623	6.040
02-19-2016 12:20:13	13.408	6.073
02-19-2016 12:21:13	13.064	6.025
02-19-2016 12:22:13	13.116	6.327
02-19-2016 12:23:13	12.924	6.170
02-19-2016 12:24:13	13.118	6.381
02-19-2016 12:25:13	12.882	6.326
02-19-2016 12:26:14	12.999	6.236
02-19-2016 12:27:14	13.192	5.830
02-19-2016 12:28:14	13.535	6.085
02-19-2016 12:29:13	13.017	6.478
02-19-2016 12:30:13	13.258	5.834

Run Averages	O2 %	CO2 %
02-19-2016 12:30:14	13.466	5.353

Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6
Test Run 1 End

Final System Bias Check, Run 1 STRATA Version 3.2.112
Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6

	Reference Cylinder Numbers Zero	Span
O2	CC96938	CC313420
CO2	CC96938	CC313420

Date/Time 02-19-2016 12:34:22 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	-0.005	-0.024
Zero Avg	0.064	0.180
Zero Bias%	0.4%	1.0%
Zero Drift%	0.1%	0.3%
Span Ref Cyl	10.100	9.670
Span Cal	10.058	9.586
Span Avg	9.955	9.290
Span Bias%	0.5%	1.4%
Span Drift%	-0.6%	-1.2%
Ini Zero Avg	0.041	0.121
Ini Span Avg	10.068	9.544
Run Avg	13.466	5.353
Co	0.052	0.150
Cm	10.012	9.417
Correct Avg	13.603	5.429

System Bias Check End

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Test Run 2 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-19-2016 12:51:04	13.953	7.611
02-19-2016 12:52:03	13.379	7.968
02-19-2016 12:53:04	13.208	7.394
02-19-2016 12:54:03	13.405	8.274
02-19-2016 12:55:03	12.547	8.017
02-19-2016 12:56:03	12.928	7.827
02-19-2016 12:57:03	12.934	7.718
02-19-2016 12:58:03	13.184	7.797
02-19-2016 12:59:03	12.893	8.352
02-19-2016 13:00:02	12.581	8.191
02-19-2016 13:01:02	13.037	7.590
02-19-2016 13:02:02	12.945	8.201
02-19-2016 13:03:03	12.369	8.349
02-19-2016 13:04:03	12.365	8.215
02-19-2016 13:05:03	12.726	7.582
02-19-2016 13:06:02	12.914	8.272
02-19-2016 13:07:03	12.809	7.095
02-19-2016 13:08:03	13.680	7.452
02-19-2016 13:09:03	13.241	7.755
02-19-2016 13:10:03	13.101	7.680
02-19-2016 13:11:03	13.453	6.860
02-19-2016 13:12:03	13.943	7.636
02-19-2016 13:13:03	13.514	6.478
02-19-2016 13:14:03	14.334	6.689
02-19-2016 13:15:03	14.117	6.928
02-19-2016 13:16:03	13.702	7.727
02-19-2016 13:17:03	13.208	7.061
02-19-2016 13:18:03	14.142	6.591
02-19-2016 13:19:02	14.391	6.618
02-19-2016 13:20:02	14.219	7.034
02-19-2016 13:21:02	13.846	7.402
02-19-2016 13:22:02	13.477	7.359
02-19-2016 13:23:03	13.623	7.021
02-19-2016 13:24:03	14.036	7.022
02-19-2016 13:25:03	13.153	8.217
02-19-2016 13:26:03	12.455	7.789
02-19-2016 13:27:03	12.812	7.766
02-19-2016 13:28:03	12.706	8.481
02-19-2016 13:29:02	12.061	8.290
02-19-2016 13:30:03	12.343	7.820
02-19-2016 13:31:03	12.559	7.971
02-19-2016 13:32:03	12.461	8.088
02-19-2016 13:33:03	12.545	7.731
02-19-2016 13:34:03	12.596	7.926
02-19-2016 13:35:03	13.031	7.258
02-19-2016 13:36:03	13.173	7.793
02-19-2016 13:37:04	12.462	8.264
02-19-2016 13:38:03	12.566	7.271
02-19-2016 13:39:03	13.492	7.018
02-19-2016 13:40:03	13.429	7.529
02-19-2016 13:41:03	13.335	7.061
02-19-2016 13:42:03	13.441	7.343
02-19-2016 13:43:03	13.462	7.076
02-19-2016 13:44:03	13.662	6.940
02-19-2016 13:45:03	14.029	6.987
02-19-2016 13:46:03	13.711	6.846
02-19-2016 13:47:03	13.896	7.207
02-19-2016 13:48:02	13.578	7.114
02-19-2016 13:49:03	13.714	6.865
02-19-2016 13:50:03	14.018	6.905
Run Averages	O2 %	CO2 %
02-19-2016 13:50:03	13.250	7.520

Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6
Test Run 2 End

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Final System Bias Check, Run 2 STRATA Version 3.2.112
Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6

	Reference Cylinder Numbers Zero	Span
O2	CC96938	CC313420
CO2	CC96938	CC313420

Date/Time 02-19-2016 13:53:50 PASSED

Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	-0.005	-0.024
Zero Avg	0.073	0.065
Zero Bias%	0.4%	0.4%
Zero Drift%	0.0%	-0.6%
Span Ref Cyl	10.100	9.670
Span Cal	10.058	9.586
Span Avg	9.960	9.014
Span Bias%	0.5%	2.8%
Span Drift%	0.0%	-1.3%
Ini Zero Avg	0.064	0.180
Ini Span Avg	9.955	9.290
Run Avg	13.250	7.520
Co	0.068	0.122
Cm	9.958	9.152
Correct Avg	13.462	7.923

System Bias Check End

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Test Run 3 STRATA Version 3.2.112

	O2 %	CO2 %
Begin calculating run averages		
02-19-2016 14:01:03	12.953	7.807
02-19-2016 14:02:03	12.878	7.835
02-19-2016 14:03:03	13.148	7.273
02-19-2016 14:04:02	13.685	7.167
02-19-2016 14:05:02	13.781	7.268
02-19-2016 14:06:02	13.463	7.390
02-19-2016 14:07:02	13.580	7.264
02-19-2016 14:08:02	13.446	7.215
02-19-2016 14:09:02	13.781	6.984
02-19-2016 14:10:02	13.841	7.187
02-19-2016 14:11:03	13.604	7.276
02-19-2016 14:12:03	13.628	7.151
02-19-2016 14:13:03	13.932	6.534
02-19-2016 14:14:03	14.350	7.045
02-19-2016 14:15:03	13.392	7.694
02-19-2016 14:16:03	12.872	7.704
02-19-2016 14:17:03	13.040	7.222
02-19-2016 14:18:02	13.052	8.009
02-19-2016 14:19:02	12.207	8.303
02-19-2016 14:20:02	12.170	7.710
02-19-2016 14:21:02	12.704	7.682
02-19-2016 14:22:03	12.400	8.092
02-19-2016 14:23:03	12.714	7.771
02-19-2016 14:24:03	12.370	7.596
02-19-2016 14:25:02	12.820	7.815
02-19-2016 14:26:02	12.494	7.820
02-19-2016 14:27:02	12.705	7.478
02-19-2016 14:28:02	13.159	7.218
02-19-2016 14:29:02	13.373	7.779
02-19-2016 14:30:02	13.278	6.507
02-19-2016 14:31:02	13.978	7.084
02-19-2016 14:32:02	13.388	7.393
02-19-2016 14:33:02	13.047	7.232
02-19-2016 14:34:03	13.606	6.830
02-19-2016 14:35:03	13.593	6.892
02-19-2016 14:36:03	13.947	7.198
02-19-2016 14:37:03	13.426	6.989
02-19-2016 14:38:03	13.404	7.273
02-19-2016 14:39:03	13.475	6.829
02-19-2016 14:40:03	13.938	6.643
02-19-2016 14:41:03	14.060	6.793
02-19-2016 14:42:03	13.869	7.211
02-19-2016 14:43:03	13.375	7.300
02-19-2016 14:44:03	13.282	7.204
02-19-2016 14:45:03	13.783	6.775
02-19-2016 14:46:02	13.749	7.056
02-19-2016 14:47:02	13.382	7.603
02-19-2016 14:48:02	13.032	7.564
02-19-2016 14:49:03	12.814	7.511
02-19-2016 14:50:03	13.155	7.443
02-19-2016 14:51:03	12.907	7.532
02-19-2016 14:52:03	12.807	7.694
02-19-2016 14:53:02	12.682	7.530
02-19-2016 14:54:02	12.983	7.812
02-19-2016 14:55:02	12.700	7.589
02-19-2016 14:56:02	12.625	7.828
02-19-2016 14:57:03	12.421	8.171
02-19-2016 14:58:03	12.277	7.313
02-19-2016 14:59:03	13.227	7.041
02-19-2016 15:00:03	13.211	7.513

Run Averages	O2 %	CO2 %
02-19-2016 15:00:03	13.215	7.378

Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6
Test Run 3 End

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00452

Final System Bias Check, Run 3 STRATA Version 3.2.112
Operator: Pat Turner
Plant Name: PCS Aurora
Location: Calciner #6

	Reference Cylinder Numbers	
	Zero	Span
O2	CC96938	CC313420
CO2	CC96938	CC313420

Date/Time 02-19-2016 15:04:04 PASSED

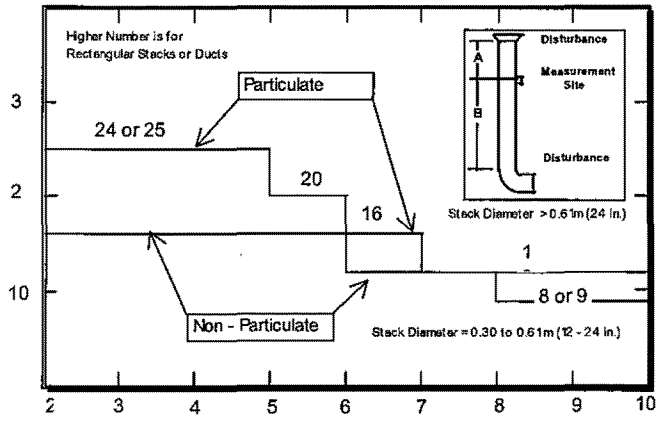
Analyte	O2	CO2
Units	%	%
Zero Ref Cyl	0.000	0.000
Zero Cal	-0.005	-0.024
Zero Avg	0.091	0.094
Zero Bias%	0.5%	0.6%
Zero Drift%	0.1%	0.1%
Span Ref Cyl	10.100	9.670
Span Cal	10.058	9.586
Span Avg	9.958	8.632
Span Bias%	0.5%	4.6%
Span Drift%	0.0%	-1.8%
Ini Zero Avg	0.073	0.065
Ini Span Avg	9.960	9.014
Run Avg	13.215	7.378
Co	0.082	0.079
Cm	9.959	8.823
Correct Avg	13.430	8.072

System Bias Check End

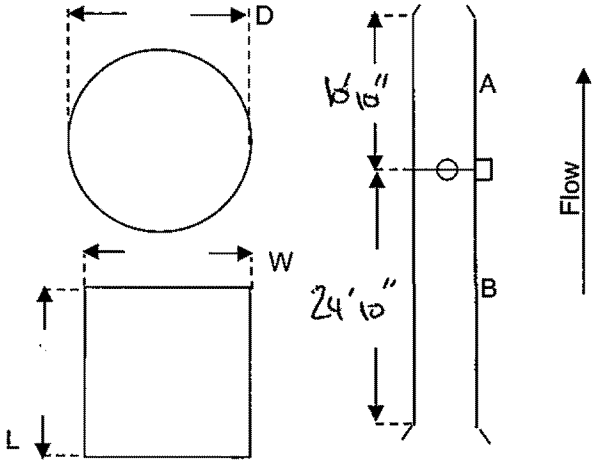
AECOM	FIELD SAMPLING DATA SHEET Sample and Velocity Traverse for Stationary Sources	EPA METHOD 1

Client/Plant: PCS	Project #: 60602248	Location: Cabinet C	Date: 01-26-15
Number of Traverse Points Chosen: 24	Number of Ports: 2	Number of Points per Port: 12	

Duct Diameters From Downstream Flow Disturbance (A/D)



Duct Diameters From Upstream Flow Disturbance (B/D)



Deq = 2LW / (L+W) _____
Dnstream Diameters (A/D) _____
Upstream Diameters (B/D) _____

Cross-Sectional Layout of Rectangular Stacks

Traverse Points	Matrix
9	3 x 3
12	4 x 3
16	4 x 4
20	5 x 4
25	5 x 5

	4	6	8	10	12	14	16	18	20	22	24
1	6.7	4.4	3.2	2.6	2.1	1.8	1.6	1.4	1.3	1.1	1.1
2	25.0	14.6	10.5	8.2	6.7	5.7	4.9	4.4	3.9	3.5	3.2
3	75.0	29.6	19.4	14.6	11.8	9.9	8.5	7.5	6.7	6.0	5.5
4	93.3	70.4	32.3	22.6	17.7	14.6	12.5	10.9	9.7	8.7	7.9
5		85.4	67.7	34.2	25.0	20.1	16.9	14.6	12.9	11.6	10.5
6		95.6	80.6	65.8	35.6	26.9	22.0	18.8	16.5	14.6	13.2
7			89.5	77.4	64.4	36.6	28.3	23.6	20.4	18.0	16.1
8			96.8	85.4	75.0	63.4	37.5	29.6	25.0	21.8	19.4
9				91.8	82.3	73.1	62.5	38.2	30.6	26.2	23.0
10				97.4	88.2	79.9	71.7	61.8	38.8	31.5	27.2
11					93.3	85.4	78.0	70.4	61.2	39.3	32.3
12					97.9	90.1	83.1	76.4	69.4	60.7	39.8
13						94.3	87.5	81.2	75.0	68.5	60.2
14						98.2	91.5	85.4	79.6	73.8	67.7
15							95.1	89.1	83.5	78.2	72.8
16							98.4	92.5	87.1	82.0	77.0
17								95.6	90.3	85.4	80.6
18								98.6	93.3	88.4	83.9
19									96.1	91.3	86.8
20									98.7	94.0	89.5
21										96.5	92.1
22										98.9	94.5
23											96.8
24											98.9

Traverse Point	Fraction of Diameter	Distance From Wall	Nipple Length	Point Location
1	2.1	1.5	5"	6.5
2	6.7	4.8		9.8
3	11.8	8.5		13.5
4	17.7	12.8		17.8
5	25.0	18.0		23.0
6	35.6	25.6		30.6
7	64.4	46.4		51.4
8	75.0	54.0		59.0
9	82.3	59.3		64.3
10	88.2	63.5		68.5
11	93.3	67.2		72.2
12	97.9	70.5		75.8

LOCATION OF TRAVERSE POINT IN RECTANGULAR STACKS.

	2	3	4	5	6	7	8	9	10	11	12
1	25.0	16.7	12.5	10.0	8.3	7.1	6.3	5.6	5.0	4.5	4.2
2	75.0	50.0	37.5	30.0	25.0	21.4	18.8	16.7	15.0	13.6	12.5
3		83.3	62.5	50.0	41.7	35.7	31.3	27.8	25.0	22.7	20.8
4			87.5	70.0	58.3	50.0	43.8	38.9	35.0	31.8	29.2
5				90.0	75.0	64.3	56.3	50.0	45.0	40.9	37.5
6					91.7	78.6	68.8	61.1	55.0	50.0	45.8
7						92.9	81.3	72.2	65.0	59.1	54.2
8							93.8	83.3	75.0	68.2	62.5
9								94.4	85.0	77.3	70.8
10									95.0	86.4	79.2
11										95.5	87.5
12											95.8

AECOM

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 01/26/15	Operator(s): WL/BM
Location: Cal #6	Condition: Normal	Moisture Run #: 1	Duration (min):
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84

P_{bar} ("Hg): ~~30.10~~ 30.29 | Height w.r.t. Barometer (ft): 100 | P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft):	Duct Diameter ("):
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Pitot Tube ID#:	
O_2 (%/time)	% (:)	% (:)	% (:)	
CO_2 (%/time)	% (:)	% (:)	% (:)	

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #:		Flow Run #:		Cyclonic Angle (°)
						Start 12:38	End 12:59	Start :	End :	Start :	End :	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)		ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					A1	.31	153					0
					2	.39	144					2
					3	.33	152					0
					4	.31	148					3
					5	.32	149					2
					6	.34	150					0
					7	.25	143					0
					8	.22	142					0
					9	.19	148					0
					10	.20	148					5
					11	.25	148					5
					12	.25	148					5
					B1	.23	140					11
					2	.23	147					7
					3	.24	145					7
					4	.23	143					4
					5	.20	141					3
					6	.26	140					3
					7	.25	137					0
					8	.27	137					15
					9	.30	151					18
					10	.26	143					18
					11	.27	141					18
					12	.27	141					18

Comments:

AECOM — FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 01/26/16	Operator(s): WL/BM
Location: Cal, #6	Condition: Normal	Run #: 1	Duration (min): 72
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.45	P_{bar} ("Hg): ~~30.10~~ 30.29 DM	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 15	Source Height (ft): 100		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 11	Duct Width ("):		Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓			Nozzle D1 (") Ø: 0.~~278~~ 0.275 R
Probe & Pitot ID: RTP-6-7					Nozzle D2 (") ⊘: 0.279
					Nozzle D3 (") ⊖: 0.276
					Average Nozzle D ("): 0.276

Sample Point Port	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
B 1	1445	0	718.349	.29	1.00	160			61	71	71	3
2		3	720.04	.31	1.06	158			54	71	70	3
3		6	721.67	.25	.86	159			53	71	70	2
4		9	723.24	.34	1.17	149			53	72	70	4
5		12	724.84	.30	1.03	161			53	73	70	4
6		15	726.47	.35	1.20	160			55	74	70	5
7		18	728.26	.38	1.31	148			55	75	70	5
8		21	730.06	.45	1.55	147			58	76	71	7
9		24	731.88	.32	1.10	144			58	76	70	6
10		27	733.65	.37	1.27	143			58	77	71	7
11		30	735.48	.34	1.17	157			58	77	71	7
12		33	737.31	.34	1.17	155			58	77	71	7
1523	1523	36	739.110			Port	Change					
A 1	1527		739.110	.38	1.31	161			61	76	72	7
2		39	740.92	.40	1.38	158			56	77	72	7
.62→ 3		42	742.77	.47	1.63	161			54	78	72	8
4		45	744.69	.28	.96	153			54	78	72	6
5		48	746.37	.37	1.27	161			56	78	72	8
6		51	748.18	.32	1.10	154			56	78	72	7
7		54	749.92	.28	.96	149			56	78	72	7
8		57	751.57	.32	1.10	150			57	78	73	7
9		60	753.25	.29	1.00	158			57	78	72	7
10		63	754.88	.34	1.17	145			57	78	73	7
11		66	756.50	.32	1.10	151			57	78	73	7
12		69	758.33	.27	.93	153			57	78	73	7
	1603	72	759.917									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant:	PCS	Project #:	60402248.10	Date:	01/26/16
Location:	CO1 B1	Condition:	Normal	Run #:	1

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	772.1	990.4	
2	DI H_2O	100	GS	698.3	881.3	
3	Empty	--	MOD	638.7	644.7	
4	Silica Gel	--	MOD	904.1	915.4	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 01/26/16	Operator(s): WL/BM
Location: Cal. #6	Condition: Normal	Run #: 2	Duration (min): 72
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.45	P_{bar} ("Hg): ~~30.10~~ 30.29 Dm	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0	Vac. ("Hg): 11	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >max vacuum)	ft^3/min: 0	Vac. ("Hg): 16	Duct Width ("):	Duct Length ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: 0.275	
Probe & Pitot ID: RTP 6-7			Nozzle D2 (") ⊘: 0.279	
			Nozzle D3 (") ⊖: 0.276	
			Average Nozzle D ("): 0.276	

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
Port												
A1	1650	0	760.221	.34	1.17	150			63	69	70	5
2		3	761.98	.30	1.03	160			58	69	70	5
3		6	763.57	.32	1.10	154			54	69	68	8
4		9	765.71	.37	1.27	151			53	69	68	8
5		12	767.00	.37	1.27	150			52	69	68	10
6		15	768.72	.32	1.10	160			52	69	67	10
7		18	770.38	.29	1.00	158			52	69	67	10
8		21	772.01	.27	.93	148			52	69	66	10
9		24	773.62	.28	.96	151			53	69	67	10
10		27	775.23	.30	1.03	152			53	69	66	10
11		30	776.84	.29	1.00	143			53	69	66	10
12		33	778.46	.27	.93	153			53	69	66	10
	1726	36	780.085			— Port		Change	—			
B1	1730		780.085	.31	1.06	151			57	68	66	10
2		39	781.76	.32	1.10	158			55	68	66	10
3		42	783.31	.32	1.10	161			54	68	66	10
4		45	785.02	.28	.96	150			54	68	66	10
5		48	786.67	.29	1.00	161			54	68	66	10
6		51	788.21	.36	1.24	156			55	68	66	10
7		54	789.87	.25	.86	160			55	68	66	10
8		57	791.46	.26	.89	159			56	67	66	10
9		60	792.93	.27	.93	161			56	67	66	10
10		63	794.48	.27	.93	154			56	67	66	10
11		66	796.17	.28	.96	154			56	67	66	10
12		69	797.68	.28	.96	158			56	67	66	10
	1806	72	799.310									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS Ca/ #6	Project #: 60402248.10	Date: 1-26-16
Location: Calciner #6	Condition: Normal	Run #: 2

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	637.0	907.2	
2	DI H_2O	100	GS	722.8	805.0	
3	Empty	--	MOD	654.1	658.3	
4	Silica Gel	--	MOD	906.5	916.4	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

EPA Method 13A/B

PAGE 1 OF 4

Client/Plant: PCS	Project #: 60402248.10	Date: 01/26/16	Operator(s): WL/BM
Location: Col. #6	Condition: Normal	Run #: 3	Duration (min): 72
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.45	P_{bar} ("Hg): 30.10	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -.29

Initial Leak ✓ (<0.02 ft³/min; >10"Hg)	ft³/min: 0	Vac. ("Hg): 16	Source Height (ft):	Duct Diameter ("):
Final Leak ✓ (<0.02 ft³/min; >max vacuum)	ft³/min: 0	Vac. ("Hg): 12	Duct Width ("):	Duct Length ("):

Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Nozzle D1 (") Ø: .275
Probe & Pitot ID: RTP-6-7			Nozzle D2 (") ⊘: .279
			Nozzle D3 (") ⊖: .278
			Average Nozzle D ("): .276

Sample Point	Time		DGM Volume (ft³)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F)						Pump Vac. ("Hg)
	Clock	Run (min)				Source	Probe 248±25	Filter 248±25	Impinger Exit ≤68	DGM Inlet	DGM Outlet	
Port												
B1	1905	0	799.610	.29	1.00	152			48	62	63	2
2		3	801.35	.30	1.03	141			45	62	62	2
3		6	802.98	.31	1.06	159			45	63	62	3
4		9	804.65	.34	1.17	160			45	64	62	3
5		12	806.37	.42	1.44	159			46	64	61	4
6		15	808.26	.34	1.17	160			46	66	62	4
7		18	810.07	.37	1.27	152			47	66	61	5
8		21	811.85	.37	1.27	160			48	67	62	5
9		24	813.66	.35	1.20	158			49	68	62	5
10		27	815.87	.38	1.31	157			49	68	62	6
11		30	817.27	.38	1.31	155			49	68	62	6
12		33	819.26	.38	1.31	152			49	68	62	6
	1941	36	821.012	— Port Change —								
A1	1945		821.012	.39	1.34	145			53	66	62	6
2		39	822.87	.37	1.27	156			51	68	62	6
3		42	824.68	.40	1.38	144			51	68	62	8
4		45	826.57	.38	1.31	149			53	69	63	8
5		48	828.45	.36	1.24	158			55	69	62	8
6		51	830.27	.41	1.41	150			56	69	63	8
7		54	832.14	.34	1.17	156			58	70	63	8
8		57	833.88	.31	1.06	151			59	70	63	8
9		60	835.56	.28	.96	157			59	70	63	8
10		63	837.21	.38	1.31	157			58	70	63	8
11		66	838.99	.31	1.06	159			58	70	63	8
12		69	840.67	.27	.93	160			58	70	63	8
	2021	72	842.230									

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 13A/B

Client/Plant: PCS	Project #: 60407248.10	Date: 1-26-16
Location: Calciner #6	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger#	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
1	DI H_2O	100	MOD	755.3	999.3	
2	DI H_2O	100	GS	674.5	807.1	
3	Empty	--	MOD	641.5	646.6	
4	Silica Gel	--	MOD	915.3	925.9	
Sum						

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
Filter (no weights)			
PNR & Impinger Catch (DI H_2O Rinse)			

COMMENTS:

AECOM

Plant Name	PCS	Date	2-19-16	Page	1 of 1
Project Number	[redacted]2248.10	Condition	Normal	Initial Leak Rate	1) 0 @ 23 "Hg; 2) 0 @ 22 "Hg
Location (Source)	CGI # 6	Run	1		
Meter ID & Cal Factors	Box-2494 Box-2663 Box #1	Operator	WL act.	Final Leak Rate	1) 0 @ 21 "Hg; 2) 0 @ 18 "Hg
Sorbent Trap IDs	1) OL211412; 2) OL232760	Bar. Press. (in. H_2O)	30.58	Third Bed Spike Level	1) 2200 ng; 2) 0
		Elevation (relative to Barometer) (ft)	100'		

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	Stack (°F)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1130	0	.75	152	297	32	251	44	2
2)		0	.75					45	3
1)	1135	3.65	.75	152	312	32	254	44	2
2)		3.79	.75					45	3
1)	1140	7.29	.75	152	297	31	261	44	2
2)		7.60	.75					45	3
1)	1145	11.22	.75	152	271	32	257	45	2
2)		11.50	.75					46	3
1)	1150	15.20	.75	152	249	32	257	45	2
2)		15.44	.75					46	3
1)	1155	19.40	.75	152	251	31	257	45	2
2)		19.60	.75					47	3
1)	1200	23.31	.75	152	256	32	256	46	2
2)		23.53	.75					48	3
1)	1205	27.19	.75	152	278	31	259	46	2
2)		27.44	.75					48	3
1)	1210	31.04	.75	152	279	31	258	47	2
2)		31.26	.76					48	3
1)	1215	34.90	.75	152	268	31	259	47	2
2)		35.10	.75					48	3
1)	1220	38.97	.75	152	260	31	259	48	2
2)		39.21	.75					49	3
1)	1225	43.12	.75	155	267	31	257	48	2
2)		43.41	.75					49	3
1)	1230	46.631	.75	156	270	31	257	48	2
2)		46.773	.75					49	3
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name	PCS	Date	2-19-16	Page	1 of 1
Project Number	60402248.10	Condition	Normal	Initial Leak Rate	1) 0 @ 30 "Hg; 2) 0 @ 25 "Hg
Location (Source)	Calciner #6	Run	#2		
Meter ID & Cal Factors	8002494 / 8002603	Operator	DM	Final Leak Rate	1) 0 @ 16 "Hg; 2) 0 @ 14 "Hg
Sorbent Trap IDs	1) OL 211407 spike	Bar. Press. (in. H_2O)	~~30.58~~ ~~30.59~~ act 30.54	Third Bed Spike Level	1) 2200ng spike; 2)
	2) OL232890	Elevation (relative to Barometer) (ft)	100'		

Box #1

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	Stack (°F)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1250	0.000	.75	160	237	32	253	48	1
2)		0.008	.75					51	2
1)	1255	4.46	.76	163	260	32	253	48	1
2)		4.43	.75					50	2
1)	1300	8.38	.76	160	297	31	255	49	1
2)		8.22	.75					52	2
1)	1305	12.30	.76	156	314	31	253	49	1
2)		12.17	.76					53	2
1)	1310	15.96	.76	166	300	32	258	49	1
2)		15.84	.75					52	2
1)	1315	19.96	.76	161	257	31	259	50	1
2)		19.89	.75					51	2
1)	1320	24.13	.75	156	240	31	257	50	1
2)		24.08	.75					53	2
1)	1325	28.42	.75	163	268	32	~~258~~	50	1
2)		28.40	.76					51	2
1)	1330	32.00	.75	164	301	31	256	51	1
2)		32.01	.75					54	2
1)	1335	35.47	.75	163	309	32	257	50	1
2)		35.63	.75					52	2
1)	1340	39.04	.75	162	270	32	262	51	1
2)		39.23	.76					52	2
1)	1345	42.78	.75	159	246	32	258	51	1
2)		43.13	.75					52	2
1)	1350	46.778	.76	149	252	32	253	51	1
2)		46.831	.75					52	2
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

Plant Name: PCS	Date: 2-19-16	Page: 1 of 1	
Project Number: 60402248.10	Condition: Normal	Initial Leak Rate	1) Ø @ 22 "Hg; 2) Ø @ 25 "Hg
Location (Source): Calciner #6	Run: #3		
Meter ID & Cal Factors: 8002494 / 8002463	Operator: WL	Final Leak Rate	1) 0 @ 18 "Hg; 2) 0 @ 16 "Hg
Sorbent Trap IDs: 1) OL211410 spike; 2) OL235498	Bar. Press. (in. H_2O): 30.51		
Box #1	Elevation (relative to Barometer) (ft): 100	Third Bed Spike Level	1) 2200 ng spike; 2)

Trap	Clock Time	Volume (L, dry)	Flow Rate (Lpm)	Stack (°F)	Temperature (°F) Sorbent	Chiller	Heat-Traced Line	Meter	Vacuum (in. Hg)
1)	1400	0.000	.75	161	269	32	254	50	1
2)		0.000	.75					52	2
1)	1405	4.65	.75	154	297	32	256	51	1
2)		4.54	.75					53	2
1)	1410	8.35	.75	163	272	31	255	51	1
2)		8.25	.75					53	2
1)	1415	12.80	.75	163	279	31	256	51	1
2)		12.73	.75					53	2
1)	1420	16.59	.75	164	281	31	257	51	1
2)		16.46	.75					53	2
1)	1425	20.57	.75	163	284	31	259	51	1
2)		20.35	.75					53	2
1)	1430	24.49	.75	160	290	31	256	51	1
2)		24.27	.75					53	2
1)	1435	28.52	.75	160	286	31	256	51	1
2)		28.30	.75					54	2
1)	1440	32.41	.75	159	274	31	257	52	1
2)		32.42	.75					54	2
1)	1445	36.27	.75	158	278	31	258	52	1
2)		36.63	.75					54	2
1)	1450	40.55	.75	161	279	31	257	52	1
2)		40.51	.75					54	2
1)	1455	44.50	.75	160	280	31	256	52	1
2)		44.27	.75					54	2
1)	1500	47.893	.75	160	279	31	256	52	1
2)		48.017	.75					54	2
1)									
2)									
1)									
2)									

Comments:

SDS-35: Mercury by Sorbent Trap - Method 30B

AECOM

FIELD SAMPLING DATA SHEET
Flow and Moisture

EPA Methods 2 & 4

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 2-19-16	Operator(s): WL/DW
Location: Cal #6	Condition: Normal	Moisture Run #: 1-2-3	Duration (min):
DGM#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
P_{bar} ("Hg):	Height w.r.t. Barometer (ft):	P_{static} ("H_2O): -.26	
Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min:	Vac. ("Hg):	Source Height (ft): 100
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min:	Vac. ("Hg):	Duct Width ("):
Pitot Leak ✓ (>3"H_2O)	+P ("H_2O): ✓	- P ("H_2O): ✓	Pitot Tube ID#: P5P-8-3
Fyrite/Orsat O_2 (%/time)	% (:)	% (:)	% (:)
Fyrite/Orsat CO_2 (%/time)	% (:)	% (:)	% (:)

Moisture Determination					Traverse Point	Flow Run #: 1		Flow Run #: 2		Flow Run #: 3		Cyclonic Angle (°)
						Start	End	Start	End	Start	End	
Time	DGM Volume (ft^3)	ΔH ("H_2O)	DGM Inlet T (°F)	DGM Outlet T (°F)	Port	12:15	12:25	12:52	12:57	14:02	:	
						ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	ΔP ("H_2O)	Source T (°F)	
					A1	.41	139	.44	137	.41	137	
					2	.42	140	.46	139	.40	137	
					3	.36	144	.45	140	.38	138	
					4	.35	146	.40	141	.38	138	
					5	.42	148	.40	141	.40	142	
					6	.40	150	.37	142	.39	145	
					7	.38	152	.35	142	.37	146	
					8	.43	152	.34	142	.35	148	
					9	.39	152	.35	143	.33	149	
					10	.44	152	.34	146	.32	150	
					11	.38	152	.29	149	.31	152	
					12	.26	151	.27	150	.29	151	
					B1	.43	151	.42	154	.46	152	
					2	.44	151	.39	154	.51	153	
					3	.43	152	.38	155	.49	154	
					4	.45	152	.40	155	.48	154	
					5	.43	154	.42	155	.44	155	
					6	.40	155	.45	156	.46	155	
					7	.53	155	.48	156	.42	156	
					8	.44	155	.52	156	.40	156	
					9	.51	155	.53	156	.37	156	
					10	.49	156	.50	156	.39	156	
					11	.32	157	.42	156	.42	152	
					12	.35	155	.28	152	.27	148	

Comments: Flows for Hg on Cal #6

AECOM

FIELD SAMPLING DATA SHEET
Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 1-27-16	Operator(s): DM/LB
Location: Caking #6	Condition: Normal	Run #: 1	Duration (min): 72
Console#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.45	P_{bar} ("Hg): 30.11	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.005	Vac. ("Hg): 12	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0.005	Vac. ("Hg): 9	Duct Width ("): --	Duct Length ("): --

Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P: ✓	-P: ✓	Nozzle D1 (") Ø: .275	
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D2 (") ⊘: .279	
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D3 (") ⊖: .276	
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Average Nozzle D ("): .276	

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	1258	0	849.921	.35	1.2	151	248	252	44	68	47	50	3
2		3	852.7	.27	.93	145	228	252	43	67	48	52	2
3		6	854.1	.25	.86	141	252	252	43	67	49	52	2
4		9	855.9	.26	.9	143	253	252	44	68	48	53	2
5	1315	12	857.3	.25	.86	142	251	252	44	67	48	54	2
* 6	1407	15	858.7	.28	.97	155	248	250	42	67	43	45	4
7		18	860.3	.32	1.1	161	251	252	41	66	42	46	
8		21	862.8	.37	1.3	143	252	249	39	67	42	46	4
9	1417	24	864.2	.38	1.3	155	238	248	39	66	42	45	4
10		27	866.1	.39	1.3	143	246	250	40	66	42	46	4
11	1423	30	867.6	.36	1.2	154	234	251	41	67	41	46	4
12	1426	33	869.4	.38	1.3	139	250	253	42	67	42	47	4
STOP	1429	36	871.215			PORT CHANGE							
B 1	1432	36	871.215	.42	1.4	146	234	251	42	66	41	45	4
2		39	873.5	.35	1.2	143	248	250	42	66	42	47	4
3		42	875.0	.32	1.1	147	237	253	42	67	42	47	4
4		45	876.6	.43	1.5	146	245	248	43	68	42	48	4
5		48	879.1	.30	1.0	135	235	247	44	68	41	47	4
6		51	880.4	.30	1.0	151	240	250	44	67	42	47	4
7		54	882.0	.35	1.2	153	250	251	45	69	41	47	4
8		57	883.4	.32	1.1	157	257	250	46	74	41	46	4
9	1457	60	885.0	.34	1.2	152	255	248	48	78	42	46	4
10	1458-1607	63	886.8	.31	1.0	146	245	249	42	66	40	45	4
11		66	888.3	.28	.97	137	250	249	42	67	41	46	3
12		69	889.7	.30	.90	154	259	247	43	65	41	47	3
END	1619	72	891.295										

COMMENTS Paused 1315 1458
1407 1608

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60402248.10	Date: 1-27-16
Location: Cal #6	Condition: Normal	Run #: 1

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	485.8	746.1	
2	MT	0	MGS	547.9	641.6	
3	Water	100	MGS	732.4	697.4	
4	Silica Gel	350	MGS	894.0	912.3	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14128	Tare Wt. (g)	0.36927
	ID#:		Tare Wt. (g)	
	ID#:	0116-101	Tare Wt. (g)	N/A

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 1-27-16	Operator(s): DW/LB
Location: Calciner #6	Condition: Normal	Run #: 2	Duration (min): 72
Console#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.45	P_{bar} ("Hg): 30.1	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: Ø	Vac. ("Hg): 13	Source Height (ft): 100	Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: Ø	Vac. ("Hg): 8	Duct Width ("): --	Duct Length ("): --
Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: /	Final +P:	-P:

Fyrite/Orsat O_2 (%/time) % (:)	Fyrite/Orsat CO_2 (%/time) % (:)	Nozzle D1 (") Ø: 0.275
Fyrite/Orsat O_2 (%/time) % (:)	Fyrite/Orsat CO_2 (%/time) % (:)	Nozzle D2 (") ⊘: 0.279
Fyrite/Orsat O_2 (%/time) % (:)	Fyrite/Orsat CO_2 (%/time) % (:)	Nozzle D3 (") ⊖: 0.276
		Average Nozzle D ("): 0.276

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
			874.611										
B1	1740	0	~~874.611~~	.37	1.3	157	249	253	~~48~~	65	42	45	4
2		3	896.5	.34	1.1	153	253	251	50	~~69~~	42	46	4
3		6	897.9	.32	1.1	156	258	250	57	~~74~~	41	46	6
4		9	899.7	.35	1.2	155	253	249	53	80	42	46	6
5		12	901.4	.37	1.3	157	242	250	55	79	42	47	6
6		15	902.9	.35	1.2	157	254	250	57	81	~~42~~	48	6
7		18	904.8	.36	1.3	158	240	252	59	78	42	~~48~~	6
8		21	906.7	~~.30~~ .27	.93	158	259	250	64	79	42	~~48~~	6
9		24	908.1	.33	1.1	156	243	250	66	79	42	49	6
10		27	909.7	.26	.96	144	251	252	68	80	42	49	6
11		30	911.4	.31	1.0	151	258	245	68	74	43	48	6
12		33	912.9	.31	1.0	144	232	254	~~68~~	62	42	49	5
Stop		36	914.445			Pulse Change							
A1	1818	36	914.445	~~.32~~ .25	1.1	155	237	256	60	68	43	47	4
2		39	916.3	.41	1.4	145	256	254	62	67	42	46	4
3		42	918.0	.37	1.3	155	257	253	65	68	41	46	4
4		45	919.9	.37	1.3	147	260	252	62	67	41	~~48~~	4
5		48	921.6	.30	1.0	155	240	250	62	66	41	45	4
6		51	923.6	~~.30~~	.70	143	261	250	~~61~~	67	~~40~~	45	4
7		54	925.3	.22	.76	141	236	257	59	67	40	45	3
8		57	926.6	.20	.69	147	263	257	58	65	40	44	3
9		60	928.0	.18	.61	154	232	257	58	66	40	45	3
10		63	929.3	.23	.79	162	264	250	57	68	41	45	3
11		66	930.8	.25	~~.87~~ .86	129	262	257	57	69	40	43	3
12		69	~~931.3~~ 931.3	.16	.53	~~126~~ 126	261	250	58	69	~~38~~ 38	42	3
	1953	72	933.710										

COMMENTS: Wash Cycle: R19-1849 Paused 1857 1948 1

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60402248.10	Date: 1-27-16
Location: Cal #6	Condition: Normal	Run #: 2

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	502.9	678.9	
2	MT	0	MGS	594.1	654.9	
3	Water	100	MGS	706.0	710.5	
4	Silica Gel	350	MGS	937.2	956.1	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14127	Tare Wt. (g)	0.37373
	ID#:		Tare Wt. (g)	
	ID#:	0116-101	Tare Wt. (g)	N/A

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

FIELD SAMPLING DATA SHEET

Particulate Matter M5/202

EPA Method 5/202

PAGE 1 OF 1

Client/Plant: PCS	Project #: 60402248.10	Date: 1-28-16	Operator(s): DM/LB
Location: Calciner #6	Condition: Normal	Run #: 3	Duration (min): 72
Console#: N-45	CF (Yd): 0.9943	$\Delta H_@$: 1.7992	Cp: 0.84
K-Factor: 3.45	P_{bar} ("Hg): 29.98 est.	Height w.r.t. Barometer (ft): 100	P_{static} ("H_2O): -.24

Initial Leak ✓ (<0.02 ft^3/min; >10"Hg)	ft^3/min: 0.0	Vac. ("Hg): 13	Source Height (ft): 100'		Duct Diameter ("): 72
Final Leak ✓ (<0.02 ft^3/min; >run maximum)	ft^3/min: 0	Vac. ("Hg): 7	Duct Width ("): --		Duct Length ("): --
Pitot Leak ✓ (>3"H_2O)	Initial +P: ✓	-P: ✓	Final +P: ✓	-P: ✓	Nozzle D1 (") Ø: 0.275
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D2 (") ⊗: 0.279
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Nozzle D3 (") ⊖: 0.276
Fyrite/Orsat O_2 (%/time)	% (:)	Fyrite/Orsat CO_2 (%/time)	% (:)		Average Nozzle D ("): 0.276

Sample Point	Time: Clock	Time: Run (min)	DGM Volume (ft^3)	ΔP ("H_2O)	ΔH ("H_2O)	Temperature (°F): Source	Probe 248 ± 25	Filter 248 ± 25	Impinger Exit ≤68	CPM Filter 65-85	DGM Inlet	DGM Outlet	Pump Vac. ("Hg)
A1	0955	0	934.498	.23	.79	144	257	248	39	65	40	43	3
2		3	935.9	.23	.79	142	247	250	36	65	40	44	3
3		6	937.3	.22	.76	143	261	252	37	66	40	45	3
4		9	938.1	.23	.79	144	249	251	39	66	41	46	3
5		12	940.3	.27	.93	153	253	252	39	65	41	47	4
6		15	941.8	.25	.86	145	250	257	40	67	42	48	4
7		18	943.1	.28	.97	154	264	257	40	67	41	47	5
8		21	944.7	.33	1.1	146	243	252	41	67	41	48	5
9		24	946.4	.36	1.2	151	262	252	41	66	42	49	6
10		27	948.1	.35	1.2	154	237	250	42	67	42	49	6
11		30	949.7	.36	1.2	156	257	252	44	68	43	50	7
12		33	951.5	.33	1.1	149	241	257	45	74	43	51	7
Stop		36	953.185				PORT	CHANGE					
B1		36	953.185	.30	1.0	147	227	248	45	65	44	50	5
2		39	954.8	.31	1.1	154	243	251	46	65	44	51	6
3		42	956.7	.28	.97	155	262	255	47	67	44	52	5
4		45	958.3	.28	.97	156	244	250	47	69	45	53	6
5		48	959.8	.29	1.0	157	264	251	49	72	46	53	6
6		51	961.4	.33	1.1	158	239	254	49	73	46	54	6
7		54	963.2	.34	1.2	160	262	252	50	74	47	54	6
8		57	964.8	.32	1.1	158	238	255	51	75	47	55	6
9		60	966.5	.31	1.1	154	260	264	52	77	47	55	6
10		63	968.14	.25	.86	155	237	251	53	77	48	56	6
11		66	969.9	.27	.93	153	260	250	54	75	48	56	6
12		69	971.5	.30	1.0	155	235	253	54	73	49	56	5
END	1111	72	973.191										

COMMENTS

AECOM	FIELD SAMPLING DATA SHEET (RECOVERY)	METHOD 5/202

Client/Plant: PCS	Project #: 60482248.10	Date: 1-27-16
Location: Calciner #6	Condition: Normal	Run #: 3

Method 4 Moisture Determination						
Impinger #	Impinger Contents	Approximate Volume (ml)	Configuration	Initial (g)	Final (g)	Gain (g)
Condenser	MT	0	VCON			
1	MT	0	KO	487.2	754.3	
2	MT	0	MGS	654.8	743.2	
3	Water	100	MGS	610.9	625.2	
4	Silica Gel	350	MGS	877.5	896.5	
					Sum	

Purge Train with UHP nitrogen at 14 liters per minute for one hour prior to sample recovery

Purge Time	CPM Filter Temp	Rotameter Reading
Start:		
Stop:		

C1: Filter	ID#:	14126	Tare Wt. (g)	0.37582
	ID#:		Tare Wt. (g)	
	ID#:	0116-101	Tare Wt. (g)	N/A

Recovery Container Weights	Tare (g)	Final (g)	Gain (g)
PNR - Acetone			
Filter			
CPM Filter			
Impinger & Water Rinse			
Acetone and Hexane Rinses			

COMMENTS:

AECOM

Barometric Pressure (BP) Summary for PCS Calciner HF Testing (2016)

Calciner	Date	Test Time	BP (in. Hg)	BP Corrected for PCS Calciner Elevation (in. Hg)
1	2/10/2016	11:10-12:26	29.95	29.85
	2/10/2016	13:05-14:20	29.89	29.79
	2/10/2016	14:40-15:56	29.87	29.77
2	2/3/2016	14:10-15:26	30.04	29.94
	2/12/2016	10:10-11:25	30.26	30.16
	2/12/2016	13:20-14:41	30.09	29.99
3	2/13/2016	9:40-10:57	30.26	30.16
	2/13/2016	12:20-13:35	30.28	30.18
	2/13/2016	14:31-15:46	30.27	30.17
4	2/1/2016	12:50-14:05	29.95	29.85
	2/1/2016	14:29-15:54	29.92	29.82
	2/1/2016	17:25-18:39	29.93	29.83
5	1/27/2016	11:38-13:20	30.12	30.02
	1/27/2016	13:40-15:04	30.09	29.99
	1/27/2016	16:20-17:35	30.12	30.02
6	1/26/2016	13:55-15:28	30.18	30.08
	1/26/2016	16:50-17:25	30.16	30.06
	1/26/2016	19:05-20:21	30.17	30.07

Note: BP obtained from NWS station located in New Bern, NC (KEWN). Elevation of KEWN is approximately 10 ft. ASL

Height of Calciner Ports (ft) = 100

AECOM

Barometric Pressure (BP) Summary for PCS Calciner PM Testing (2016)

Calciner	Date	Test Time	BP (in. Hg)*	BP Corrected for PCS Calciner Elevation (in. Hg)
2	2/1/2016	13:20-14:34	29.93	29.83
	2/1/2016	16:25- 17:40	29.92	29.82
	2/2/2016	10:30- 11:48	30.27	30.17
	2/2/2016	13:37 -14:52	30.22	30.12
4	2/3/2016	10:02-11:19	30.11	30.01
	2/3/2016	12:30-14:19	30.08	29.98
	2/9/2016	9:37-10:59	29.69	29.59
5	1/26/2016	14:45-16:04	30.16	30.06
	1/26/2016	16:50-19:10	30.17	30.07
	1/26/2016	20:00-21:14	30.17	30.07
6	1/27/2016	12:58-16:19	30.09	29.99
	1/27/2016	17:40-19:53	30.13	30.03
	1/28/2016	9:55-11:11	29.99	29.89

*Note: BP obtained from NWS station located in New Bern, NC (KEWN). Elevation of KEWN is approximately 19 ft. ASL

Height of Calciner Ports (ft) = 100

AECOM

Barometric Pressure (BP) Summary for PCS Calciner Hg Testing (2016)

Calciner	Date	Test Time	BP (in. Hg)	BP Corrected for PCS Calciner Elevation (in. Hg)
1	2/11/2016	10:25 - 11:25	30.23	30.13
		12:00 - 13:00	30.21	30.11
		13:35 - 14:35	30.16	30.06
2 (Re-test)	2/13/2016	10:55 - 11:55	30.27	30.17
		12:40 - 13:40	30.27	30.17
		14:30 - 15:30	30.27	30.17
3	2/12/2016	16:10 - 17:10	30.05	29.95
		17:45 - 18:45	30.03	29.93
		19:05 - 20:05	30.03	29.93
4	2/10/2016	12:25 - 13:25	29.89	29.79
		13:45 - 14:45	29.88	29.78
		15:05 - 16:05	29.87	29.77
5	2/8/2016	14:15 - 15:15	29.71	29.61
		15:30 - 16:30	29.75	29.65
		16:41 - 17:41	29.79	29.69
6	2/19/2016	11:30-12:30	30.59	30.49
		12:50-13:50	30.54	30.44
		14:00-15:00	30.51	30.41

Note: BP obtained from NWS station located in New Bern, NC (KEWN). Elevation of KEWN is approximately 19 ft. ASL

Height of Calciner Ports (ft) = 100

AECOM

Measured PCS Calciner O_2 and CO_2 Values (2016)

Calciner	Date	O2	CO2
1	2/12/2016	15.05	6.27
2	1/30/2016	14.79	6.24
2	2/13/2016	13.99	7.18
3	2/12/2016	15.08	5.73
4	2/11/2016	15.11	5.99
5	2/8/2016	13.53	7.66
6	2/19/2016	13.50	7.14

Note: O2/CO2 Measured during Hg test runs.

Minimum:	13.50	5.73
Maximum:	15.11	7.66
Standard Deviation:	0.74	0.72
Average:	14.44	6.60

APPENDIX B
PROCESS OPERATING DATA

APPENDIX B-1
PARTICULATES

PCS Calciners Stack Testing Matrix and Associated Process Data - 2016 Test Program

		Test #	Date	Start	Finish	Dp (" H_2O)	Flow (GPM)	Feed Rate (TPH-wet)	Target Feed Rate (TPH-wet)	Moisture, %	Feed Rate (TPH-dry)
Calciner #1	Mercury	1	2/11/2016	10:25	11:25	20.1	250.2	70.0	67.1	12.4	61.3
		2	2/11/2016	12:00	13:00	19.9	250.0	70.0	67.1	12.4	61.3
		3	2/11/2016	13:35	14:25	20.0	248.6	70.0	67.1	12.4	61.3
	Fluoride	1	2/10/2016	11:10	12:26	9.1[d]	253.9	70.0	67.1	12.3	61.4
		2	2/10/2016	13:05	14:18	7.5[d]	258.8	70.0	67.1	12.3	61.4
		3	2/10/2016	14:40	15:57	5.0[d]	256.5	70.0	67.1	12.3	61.4
Calciner #2	PM	1[c]	2/1/2016	13:20	14:34	10.0	284.8	70.1	66.4	12.3	61.5
		2	2/1/2016	16:25	17:40	6.7	286.8	70.1	66.4	12.3	61.5
		3	2/2/2016	10:30	11:48	7.8	292.8	70.1	66.4	12.3	61.5
		4	2/2/2016	13:37	14:52	10.0	277.9	69.7	66.4	12.3	61.1
	Mercury	1	1/30/2016	11:00	12:00	7.9	281.4	70.0	65.5	12.3	61.4
		2	1/30/2016	12:20	13:20	8.2	277.4	70.0	65.5	12.3	61.4
		3	1/30/2016	14:35	15:35	7.6	272.7	70.0	65.5	12.3	61.4
	Mercury	4	2/13/2016	10:55	11:55	9.1	284.8	67.3	66.4	12.9	58.7
		5	2/13/2016	12:40	13:40	9.5	278.0	67.3	66.4	12.9	58.7
		6	2/13/2016	14:30	15:30	7.9	282.9	67.3	66.4	12.9	58.7
	Fluoride	1	2/3/2016	14:10	15:26	9.0	284.5	69.9	66.4	12.4	61.2
		2	2/12/2016	10:10	11:25	8.3	286.7	65.8	66.4	12.6	57.5
		3	2/12/2016	13:20	14:41	8.4	273.6	65.8	66.4	12.6	57.5
Calciner #3	Mercury	1	2/11/2016	16:10	17:10	10.4	253.4	70.0	66.5	12.4	61.3
		2	2/11/2016	17:45	18:45	10.0	253.4	70.0	66.5	12.4	61.3
		3	2/11/2016	19:05	20:05	9.5	253.3	70.0	66.5	12.4	61.3
	Fluoride	1	2/13/2016	9:40	10:59	4.5[d]	263.2	67.4	66.5	12.9	58.7
		2	2/13/2016	12:20	13:35	3.5[d]	262.8	67.4	66.5	12.9	58.7
		3	2/13/2016	14:31	15:46	3.4[d]	264.7	67.4	66.5	12.9	58.7
Calciner #4	PM	1	2/3/2016	10:02	11:19	14.1	316.6	63.6	61.4	12.3	55.8
		2	2/3/2016	12:30	14:19	14.1	317.3	63.6	61.4	12.3	55.8
		3	2/9/2016	9:37	10:59	11.1	269.8	67.4	67.4	13.0	58.6
	Mercury	1	2/10/2016	12:25	13:25	1.8	325.1	67.1	61.4	12.3	58.8
		2	2/10/2016	13:45	14:45	5.5	316.4	67.1	61.4	12.3	58.8
		3	2/10/2016	15:05	16:05	7.8	333.2	67.1	61.4	12.3	58.8
	Fluoride	1[a]	2/1/2016	12:50	14:05	-0.5[d]	323.1	67.9	61.4	12.3	59.5
		2[b]	2/1/2016	14:29	17:09	13.4[d]	321.6	67.9	61.4	12.3	59.5
		3	2/1/2016	17:25	18:39	14[d]	319.7	67.9	61.4	12.3	59.5
Calciner #5	PM	1	1/26/2016	14:45	16:04	12.2	358.6	67.2	65.8	12.3	59.0
		2	1/26/2016	16:50	19:10	12.3	397.4	67.2	65.8	12.3	59.0
		3	1/26/2016	20:00	21:14	13.0	446.1	67.2	65.8	12.3	59.0
	Mercury	1	2/8/2016	14:15	15:15	17.0	494.8	69.1	66.6	13.7	59.7
		2	2/8/2016	15:30	16:30	17.2	495.2	69.1	66.6	13.7	59.7
		3	2/8/2016	16:41	17:41	17.0	495.2	69.1	66.6	13.7	59.7
	Fluoride	1	1/27/2016	11:38	13:20	11.2	374.7	67.2	65.8	12.3	59.0
		2	1/27/2016	13:40	15:04	11.1	368.5	67.2	65.8	12.3	59.0
		3	1/27/2016	16:20	17:35	10.7	386.1	67.2	65.8	12.3	59.0
Calciner #6	PM	1[d]	1/27/2016	12:58	16:19	~~0.1~~	301.7	67.0	64.0	12.3	58.8
		2	1/27/2016	17:40	19:53	~~-0.2~~	325.4	67.0	64.0	12.3	58.8
		3	1/28/2016	9:55	11:11	~~-0.4~~	421.7	67.0	64.0	12.3	58.8
	Fluoride	1	1/26/2016	14:45	16:03	6.5[d]	284.1	67.9	64.0	12.3	59.5
		2	1/26/2016	16:50	18:06	5.6[d]	276.4	67.9	64.0	12.3	59.5
		3	1/26/2016	19:05	20:21	4.3[d]	274.7	67.9	64.0	12.3	59.5
	Mercury	1	2/11/2016	10:25	11:25	8.1	297.6	66.5	65.3	11.3	59.0
		2	2/11/2016	12:00	13:00	7.8	300.4	66.5	65.3	11.3	59.0
		3	2/11/2016	13:35	14:35	7.7	295.4	66.5	65.3	11.3	59.0

[a]DP may haved been cleared during/between tests due to increased Dp with constant flow.

[b]DP and flow were averaged between 16:59 and 17:14.

[c]Run #1 invalid due to a failed post run leak check.

[d]This data was used to set MACT operating ranges. PCS is in the process of arranging for improvements to monitoring equipment to address concerns about whether the existing monitors are recording accurate and reliable data on a consistent basis. If necessary, PCS will repeat total fluoride performance testing and set new operating ranges for pressure drop and flow to the Venturi scrubbers once changes to the monitoring equipment are complete.

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00478

PCS Phosphate

NUMBER 2 CALCINER

1-Feb-16

70.1 tons feed/hour => (70.1 / 100) (100%-%H2O) = Tons dry feed/hour

(70.1 t feed/hour) (100 - 12.30) = 61.5 tons dry feed/hour

59.4 tph 65-C PRODUCTION RATE

DAILY FEED=	1,575	>>>>>>>	DAILY 65-C PRODUCTION=	1,335

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 61.5 tons dry feed / hour =

2472.6 lbs coal / hour or, 1.24 tons coal / hour

02/26/16
10:58 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	2
DATE>>	1-Feb-16
FEED RATE DURING TEST>>	70.1
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1575
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 2 CALCINER

2-Feb-16

69.7 tons feed / hour => (69.7) (100%-%H2O) / 100 = Tons dry feed / hour

(69.7 t feed) (100 - 12.30) / hour = 61.1 tons dry feed / hour

59.1 tph 65-C PRODUCTION RATE

DAILY FEED=	1,625	>>>>>>>	DAILY 65-C PRODUCTION=	1,377

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 61.1 tons dry feed / hour =

2458.4 lbs coal / hour or, 1.23 tons coal / hour

02/26/16
11:05 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	2
DATE>>	2-Feb-16
FEED RATE DURING TEST>>	69.7
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1625
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 4 CALCINER

3-Feb-16

63.6 tons feed / hour => (63.6) (100%-%H2O) = Tons dry feed / hour
100

(63.6 t feed) (100 - 12.30) = 55.8 tons dry feed / hour
hour

53.9 tph 65-C PRODUCTION RATE

DAILY FEED= 1,301 >>>>>>> DAILY 65-C PRODUCTION= 1,103

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 55.8 tons dry feed / hour =

2243.3 lbs coal / hour or, 1.12 tons coal / hour

02/26/16
3:41 PM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	4
DATE>>	3-Feb-16
FEED RATE DURING TEST>>	63.6
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1301
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 4 CALCINER

9-Feb-16

67.4 tons feed / hour => (67.4) (100%-%H2O) / 100 = Tons dry feed / hour

(67.4 t feed) (100 - 13.00) / hour = 58.6 tons dry feed / hour

56.7 tph 65-C PRODUCTION RATE

DAILY FEED=	1,564	>>>>>>>	DAILY 65-C PRODUCTION=	1,315

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 58.6 tons dry feed / hour =

2358.3 lbs coal / hour or, 1.18 tons coal / hour

02/26/16
3:46 PM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	4
DATE>>	9-Feb-16
FEED RATE DURING TEST>>	67.4
PERCENT MOISTURE OF FEED>>	13.00
FEED DURING ENTIRE DAY>>	1564
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 5 CALCINER

26-Jan-16

67.2 tons feed / hour => (67.22) (100%-%H2O) / 100 = Tons dry feed / hour

(67.22 t feed / hour) (100 - 12.30) = 59.0 tons dry feed / hour

57.2 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,532	>>>>>>>	DAILY 65-C PRODUCTION=	1,304

Loss on Ignition is calculated using assays. In the month of December 2016 it was 2.98 %

Coal usage is based on consumption per ton calcine produced, which is 48.1 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(48.1 lbs coal) / (ton calcine) (1 ton calcine) / (1.0298 tons dry feed) =

46.67 lbs coal / 1 ton dry feed or, at 59.0 tons dry feed / hour =

2751.2 lbs coal / hour or, 1.38 tons coal / hour

02/23/16
9:34 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	5
DATE>>	1/26/2016
FEED RATE DURING TEST>>	67.2
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1532
PREVIOUS MONTH>>	December
YEAR>>	2016
PREVIOUS MONTH LOI>>	97.02
PREVIOUS MONTH COAL #/T>>	48.1

PCS Phosphate

NUMBER 6 **CALCINER**

27-Jan-16

67.0 tons feed/hour => (67) (100%-%H2O) / 100 = Tons dry feed/hour

(67 t feed/hour) (100 - 12.30) = 58.8 tons dry feed/hour

57.0 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,337	>>>>>>>	DAILY 65-C PRODUCTION=	1,138

Loss on Ignition is calculated using assays. In the month of December 2016 it was 2.98 %

Coal usage is based on consumption per ton calcine produced, which is 48.1 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(48.1 lbs coal) / (ton calcine) (1 ton calcine) / (1.0298 tons dry feed) =

46.71 lbs coal / 1 ton dry feed or, at 58.8 tons dry feed / hour =

2744.5 lbs coal / hour or, 1.37 tons coal / hour

02/24/16
8:36 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	6
DATE>>	1/27/2016
FEED RATE DURING TEST>>	67.0
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1337
PREVIOUS MONTH>>	December
YEAR>>	2016
PREVIOUS MONTH LOI>>	97.02
PREVIOUS MONTH COAL #/T>>	48.1

PCS Phosphate

NUMBER 6 CALCINER

28-Jan-16

66.9 tons feed / hour => (66.9 / 100) (100%-%H2O) = Tons dry feed / hour

(66.9 t feed / hour) (100 - 12.30) = 58.7 tons dry feed / hour

56.9 tph 65-C PRODUCTION RATE

DAILY FEED=	1,354	>>>>>>>	DAILY 65-C PRODUCTION=	1,152

Loss on Ignition is calculated using assays. In the month of December 2016 it was 2.98 %

Coal usage is based on consumption per ton calcine produced, which is 48.1 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(48.1 lbs coal) / (ton calcine) (1 ton calcine) / (1.0298 tons dry feed) =

46.71 lbs coal / 1 ton dry feed or, at 58.7 tons dry feed / hour =

2740.4 lbs coal / hour or, 1.37 tons coal / hour

03/23/16
12:35 PM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	6
DATE>>	1/28/2016
FEED RATE DURING TEST>>	66.9
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1354
PREVIOUS MONTH>>	December
YEAR>>	2016
PREVIOUS MONTH LOI>>	97.02
PREVIOUS MONTH COAL #/T>>	48.1

APPENDIX B-2
FLUORIDE

PCS Phosphate

NUMBER 1 CALCINER

10-Feb-16

70.0 tons feed/hour => (69.98) (100%-%H2O) = Tons dry feed/hour
100

(69.98 t feed/hour) (100 - 12.30) = 61.4 tons dry feed/hour

59.3 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,632	>>>>>>>	DAILY 65-C PRODUCTION=	1,383

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal/ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 61.4 tons dry feed / hour =

2468.3 lbs coal/hour or, 1.23 tons coal/hour

03/18/16
8:59 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	1
DATE>>	10-Feb-16
FEED RATE DURING TEST>>	70.0
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1632
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 2 CALCINER

3-Feb-16

69.9 tons feed/hour => (69.87) (100%-%H2O) = Tons dry feed/hour
100

(69.87 t feed/hour) (100 - 12.30) = 61.3 tons dry feed/hour

59.2 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,446	>>>>>>>	DAILY 65-C PRODUCTION=	1,226

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal/ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal/1 ton dry feed or, at 61.3 tons dry feed/hour =

2464.4 lbs coal/hour or, 1.23 tons coal/hour

03/18/16
8:04 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	2
DATE>>	3-Feb-16
FEED RATE DURING TEST>>	69.9
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1446
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 2 CALCINER

12-Feb-16

65.8 tons feed / hour => (65.8) (100%-%H2O) = Tons dry feed / hour
100

(65.8 t feed) (100 - 12.64) = 57.5 tons dry feed / hour
hour

55.6 tph 65-C PRODUCTION RATE

DAILY FEED=	1,363	>>>>>>>	DAILY 65-C PRODUCTION=	1,151

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) (1 ton calcine) =
(ton calcine) (1.0336 tons dry feed)

40.22 lbs coal / 1 ton dry feed or, at 57.5 tons dry feed / hour =

2311.9 lbs coal / hour or, 1.16 tons coal / hour

03/23/16
2:15 PM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	2
DATE>>	12-Feb-16
FEED RATE DURING TEST>>	65.8
PERCENT MOISTURE OF FEED>>	12.64
FEED DURING ENTIRE DAY>>	1363
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 3 CALCINER

13-Feb-16

67.4 tons feed / hour => (67.39) (100%-%H2O) = Tons dry feed / hour
100

(67.39 t feed / hour) (100 - 12.90) = 58.7 tons dry feed / hour

56.7 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,530	>>>>>>>	DAILY 65-C PRODUCTION=	1,288

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 58.7 tons dry feed / hour =

2360.7 lbs coal / hour or, 1.18 tons coal / hour

03/18/16
9:00 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	3
DATE>>	13-Feb-16
FEED RATE DURING TEST>>	67.4
PERCENT MOISTURE OF FEED>>	12.90
FEED DURING ENTIRE DAY>>	1530
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 4 **CALCINER**

1-Feb-16

67.9 tons feed/hour => (67.9 / 100) (100%-%H2O) = Tons dry feed/hour

(67.9 t feed/hour) (100 - 12.30) = 59.5 tons dry feed/hour

57.5 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,236	>>>>>>>	DAILY 65-C PRODUCTION=	1,048

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 59.5 tons dry feed / hour =

2395.0 lbs coal / hour or, 1.20 tons coal / hour

03/18/16
9:05 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	4
DATE>>	1-Feb-16
FEED RATE DURING TEST>>	67.9
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1236
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 5 CALCINER

27-Jan-16

67.2 tons feed / hour => (67.2) (100%-%H2O) = Tons dry feed / hour
100

(67.2 t feed) (100 - 12.30) = 58.9 tons dry feed / hour
hour

57.2 tph 65-C PRODUCTION RATE

DAILY FEED=	1,532	>>>>>>>	DAILY 65-C PRODUCTION=	1,304

Loss on Ignition is calculated using assays. In the month of December 2016 it was 2.98 %

Coal usage is based on consumption per ton calcine produced, which is 48.1 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(48.1 lbs coal) / (ton calcine) (1 ton calcine) / (1.0298 tons dry feed) =

46.71 lbs coal / 1 ton dry feed or, at 58.9 tons dry feed / hour =

2752.7 lbs coal / hour or, 1.38 tons coal / hour

03/18/16
9:14 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	5
DATE>>	1/27/2016
FEED RATE DURING TEST>>	67.2
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1532
PREVIOUS MONTH>>	December
YEAR>>	2016
PREVIOUS MONTH LOI>>	97.02
PREVIOUS MONTH COAL #/T>>	48.1

PCS Phosphate

NUMBER 6 CALCINER

26-Jan-16

67.9 tons feed / hour => (67.86) (100%-%H2O) / 100 = Tons dry feed / hour

(67.86 t feed / hour) (100 - 12.30) = 59.5 tons dry feed / hour

57.7 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,498	>>>>>>>	DAILY 65-C PRODUCTION=	1,275

Loss on Ignition is calculated using assays. In the month of December 2016 it was 2.98 %

Coal usage is based on consumption per ton calcine produced, which is 48.1 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(48.1 lbs coal) / (ton calcine) (1 ton calcine) / (1.0298 tons dry feed) =

46.71 lbs coal / 1 ton dry feed or, at 59.5 tons dry feed / hour =

2779.7 lbs coal / hour or, 1.39 tons coal / hour

03/18/16
9:24 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	6
DATE>>	1/26/2016
FEED RATE DURING TEST>>	67.9
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1498
PREVIOUS MONTH>>	December
YEAR>>	2016
PREVIOUS MONTH LOI>>	97.02
PREVIOUS MONTH COAL #/T>>	48.1

APPENDIX B-3
MERCURY

PCS Phosphate

NUMBER 1 **CALCINER**

11-Feb-16

70.0 tons feed/hour => (69.98 / 100) (100%-%H2O) = Tons dry feed/hour

(69.98 t feed/hour) (100 - 12.40) = 61.3 tons dry feed/hour

59.2 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,623	>>>>>>>	DAILY 65-C PRODUCTION=	1,374

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 61.3 tons dry feed / hour =

2465.5 lbs coal / hour or, 1.23 tons coal / hour

03/21/16
8:08 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	1
DATE>>	11-Feb-16
FEED RATE DURING TEST>>	70.0
PERCENT MOISTURE OF FEED>>	12.40
FEED DURING ENTIRE DAY>>	1623
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 2 **CALCINER**

30-Jan-16

70.0 tons feed/hour => (70 / 100) (100%-%H2O) = Tons dry feed/hour

(70 t feed/hour) (100 - 12.30) = 61.4 tons dry feed/hour

59.6 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,400	>>>>>>>	DAILY 65-C PRODUCTION=	1,191

Loss on Ignition is calculated using assays. In the month of December 2015 it was 2.98 %

Coal usage is based on consumption per ton calcine produced, which is 54.7 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(54.7 lbs coal) / (ton calcine) (1 ton calcine) / (1.0298 tons dry feed) =

53.11 lbs coal / 1 ton dry feed or, at 61.4 tons dry feed / hour =

3260.3 lbs coal / hour or, 1.63 tons coal / hour

03/24/16
8:28 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	2
DATE>>	30-Jan-16
FEED RATE DURING TEST>>	70.0
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1400
PREVIOUS MONTH>>	December
YEAR>>	2015
PREVIOUS MONTH LOI>>	97.02
PREVIOUS MONTH COAL #/T>>	54.7

PCS Phosphate

NUMBER 2 **CALCINER**

13-Feb-16

67.3 tons feed / hour => (67.34) (100%-%H2O) / 100 = Tons dry feed / hour

(67.34 t feed / hour) (100 - 12.90) = 58.7 tons dry feed / hour

56.7 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,408	>>>>>>>	DAILY 65-C PRODUCTION=	1,185

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 58.7 tons dry feed / hour =

2359.0 lbs coal / hour or, 1.18 tons coal / hour

03/21/16
8:37 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	2
DATE>>	13-Feb-16
FEED RATE DURING TEST>>	67.3
PERCENT MOISTURE OF FEED>>	12.90
FEED DURING ENTIRE DAY>>	1408
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 3 **CALCINER**

11-Feb-16

70.0 tons feed/hour => (70 / 100) (100%-%H2O) = Tons dry feed/hour

(70 t feed/hour) (100 - 12.40) = 61.3 tons dry feed/hour

59.3 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,510	>>>>>>>	DAILY 65-C PRODUCTION=	1,278

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal or, at 1 ton dry feed

61.3 tons dry feed = hour

2466.2 lbs coal/hour or, 1.23 tons coal/hour

03/21/16
8:49 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	3
DATE>>	11-Feb-16
FEED RATE DURING TEST>>	70.0
PERCENT MOISTURE OF FEED>>	12.40
FEED DURING ENTIRE DAY>>	1510
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 4 **CALCINER**

10-Feb-16

67.1 tons feed/hour => (67.07) (100%-%H2O) = Tons dry feed/hour
100

(67.07 t feed/hour) (100 - 12.30) = 58.8 tons dry feed/hour

56.8 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,491	>>>>>>>	DAILY 65-C PRODUCTION=	1,264

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal/ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 58.8 tons dry feed / hour =

2365.7 lbs coal/hour or, 1.18 tons coal/hour

03/21/16
9:31 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	4
DATE>>	10-Feb-16
FEED RATE DURING TEST>>	67.1
PERCENT MOISTURE OF FEED>>	12.30
FEED DURING ENTIRE DAY>>	1491
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 5 **CALCINER**

8-Feb-16

69.1 tons feed/hour => (69.12) (100%-%H2O) = Tons dry feed/hour
100

(69.12 t feed/hour) (100 - 13.70) = 59.7 tons dry feed/hour

57.6 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,534	>>>>>>>	DAILY 65-C PRODUCTION=	1,279

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal/ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal) / (ton calcine) (1 ton calcine) / (1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 59.7 tons dry feed / hour =

2399.1 lbs coal/hour or, 1.20 tons coal/hour

03/21/16
9:40 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	5
DATE>>	8-Feb-16
FEED RATE DURING TEST>>	69.1
PERCENT MOISTURE OF FEED>>	13.70
FEED DURING ENTIRE DAY>>	1534
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

PCS Phosphate

NUMBER 6 **CALCINER**

19-Feb-16

66.5 tons feed/hour => (66.5 / 100) (100%-%H2O) = Tons dry feed/hour

(66.5 t feed/hour) (100 - 11.30) = 59.0 tons dry feed/hour

57.0 tph 65-C (PRODUCTION RATE)

DAILY FEED=	1,308	>>>>>>>	DAILY 65-C PRODUCTION=	1,121

Loss on Ignition is calculated using assays. In the month of January 2016 it was 3.36 %

Coal usage is based on consumption per ton calcine produced, which is 41.6 lbs coal / ton calcine for a Monthly value.

Calculate coal use during testwork based on Dry Feed:

(41.6 lbs coal / ton calcine) (1 ton calcine / 1.0336 tons dry feed) =

40.22 lbs coal / 1 ton dry feed or, at 59.0 tons dry feed / hour =

2372.3 lbs coal / hour or, 1.19 tons coal / hour

03/21/16
9:58 AM

>>STACK TEST WORKSHEET<<

CALCINER NUMBER>>	6
DATE>>	19-Feb-16
FEED RATE DURING TEST>>	66.5
PERCENT MOISTURE OF FEED>>	11.30
FEED DURING ENTIRE DAY>>	1308
PREVIOUS MONTH>>	January
YEAR>>	2016
PREVIOUS MONTH LOI>>	96.64
PREVIOUS MONTH COAL #/T>>	41.6

LIMIT MIN			36.78	96	3		0	0			
LIMIT MAX				0	93		96	96			
U:\ENVA\Air\RTR\ICR - Stack Test\2010 ICR\Parametric Monitoring\[WESP16_M_Data_02012016.xls]WESP2_Table					0		0				
				200=TitleV,0=Mac	Wash=0, Run=200		off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL2_Venturi_D**	**CAL2_Venturi_F**	**wesp2_GVC_Sec**	**wesp2_ModeStatu**	**wesp2_DeviceStat**	**wesp2_IOStatus**	**CAL2_ProcStatus**	**DataQuality**			
2/1/2016 12:44	10.28	283.7120972	58.43	0	200	63	200	450	Average dp	Average Flow	Average volts
2/1/2016 12:59	10.19	283.6917419	58.55	0	200	63	200	450			
2/1/2016 13:14	11.04	284.7768555	58.26	0	200	63	200	450	9.98	284.84	58.30
2/1/2016 13:29	10.11	285.0832214	58.21	0	200	63	200	450			
2/1/2016 13:44	9.90	284.6219177	58.48	0	200	63	200	450			
2/1/2016 13:59	9.39	284.9378967	58.50	0	200	63	200	450			
2/1/2016 14:14	11.15	284.0667114	58.36	0	200	63	200	450			
2/1/2016 14:29	9.44	284.5604248	57.85	0	200	63	200	450			
2/1/2016 14:44	8.86	285.817749	58.44	0	200	63	200	450			
2/1/2016 14:59	10.14	284.7155151	58.14	0	200	63	200	450			
2/1/2016 15:14	10.23	283.2062073	58.20	0	200	63	200	450			
2/1/2016 15:29	10.92	283.4639893	58.40	0	200	63	200	450			
2/1/2016 15:44	10.18	284.3764038	58.39	0	200	63	200	450			
2/1/2016 15:59	8.40	284.9002991	58.41	0	200	63	200	450			
2/1/2016 16:14	7.26	285.888916	57.58	0	200	63	200	450			
2/1/2016 16:29	5.78	287.165863	58.03	0	200	63	200	450	6.71	286.79	57.92
2/1/2016 16:44	6.14	288.3653564	57.82	0	200	63	200	450			
2/1/2016 16:59	6.60	286.6656189	57.75	0	200	63	200	450			
2/1/2016 17:14	6.53	286.597229	58.08	0	200	63	200	450			
2/1/2016 17:29	7.73	285.1633301	58.30	0	200	63	200	450			
2/1/2016 17:44	7.51	286.7986145	57.56	0	200	63	200	450			
2/1/2016 17:59	8.82	286.9550781	58.09	0	200	63	200	450			
2/1/2016 18:14	8.75	286.0020447	58.36	0	200	63	200	450			
2/1/2016 18:29	8.84	286.9703064	58.06	0	200	63	200	450			
2/1/2016 18:44	9.33	287.504303	57.19	0	200	63	200	450			
2/1/2016 18:59	10.58	288.9130554	57.31	0	200	63	200	450			

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00523

LIMIT MIN			36.78	96	3		0	0				
LIMIT MAX				0	93		96	96				
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02022016.xls]WESP2_Table					0		0					
				200=TitleV,0=Mac	Wash=0, Run=200		off=0,SU/SD=100,run=200					
24.00												
Time_Stamp	**CAL2_Venturi_D**	**CAL2_Venturi_F**	**wesp2_GVC_Sec**	**wesp2_ModeStatu**	**wesp2_DeviceStat**	**wesp2_IOStatus**	**CAL2_ProcStatus**	**DataQuality**				
2/2/2016 9:59	7.43	294.7731934	58.41	0	200	63	200	450	Average dp	Average Flow	Average volts	
2/2/2016 10:14	7.27	293.8833618	58.61	0	200	63	200	450				
2/2/2016 10:29	7.56	291.9526062	58.51	0	200	63	200	450	7.80	292.83	39.91	
2/2/2016 10:44	7.56	292.0074158	58.36	0	200	63	200	450				
2/2/2016 10:59	7.34	292.2038269	58.67	0	200	63	200	450				
2/2/2016 11:14	8.67	291.4221802	58.53	0	200	63	200	450				
2/2/2016 11:29	7.79	293.4343872	5.36	0	0	63	200	450				
2/2/2016 11:44	7.88	295.9596252	0.03	0	0	63	200	450				
2/2/2016 11:59	8.53	297.109314	46.67	0	0	63	200	450				
2/2/2016 12:14	7.77	295.9080811	57.00	0	200	63	200	450				
2/2/2016 12:29	7.43	297.2171326	58.17	0	200	63	200	450				
2/2/2016 12:44	7.58	295.3805237	58.46	0	200	63	200	450				
2/2/2016 12:59	9.73	294.6233826	58.45	0	200	63	200	450				
2/2/2016 13:14	11.08	290.1147156	58.40	0	200	63	200	450				
2/2/2016 13:29	11.35	289.5517273	58.55	0	200	63	200	450				
2/2/2016 13:44	11.12	288.1797791	58.45	0	200	63	200	450	9.97	277.86	58.46	
2/2/2016 13:59	11.07	272.3088684	58.38	0	200	63	200	450				
2/2/2016 14:14	10.76	272.5941162	58.53	0	200	63	200	450				
2/2/2016 14:29	8.84	278.9927063	58.46	0	200	63	200	450				
2/2/2016 14:44	8.87	275.5931702	58.56	0	200	63	200	450				
2/2/2016 14:59	9.15	279.4927979	58.40	0	200	63	200	450				
2/2/2016 15:14	9.22	282.4565735	58.51	0	200	63	200	450				
2/2/2016 15:29	9.14	283.8435364	58.44	0	200	63	200	450				
2/2/2016 15:44	9.04	287.1291504	58.33	0	200	63	200	450				
2/2/2016 15:59	8.86	289.0369263	58.38	0	200	63	200	450				
2/2/2016 16:14	8.44	290.6186523	58.53	0	200	63	200	450				

LIMIT MIN			38.56	96	5		0	0				
LIMIT MAX				0	91		96	96				
U:\ENVA\Air\RTR\ICR - Stack Test\2010 ICR\Parametric Monitoring\[WESP16_M_Data_02032016.xls]WESP4_Table					0		0					
				200=TitleV,0=Mac	Wash=0, Run=200		off=0,SU/SD=100,run=200					
24.00												
Time_Stamp	**CAL4_Venturi_D**	**CAL4_Venturi_F**	**wesp4_GVC_Sec**	**wesp4_ModeStatu**	**wesp4_DeviceStat**	**wesp4_IOStatus**	**CAL4_ProcStatus**	**DataQuality**				
2/3/2016 9:29	14.29	316.7032776	56.84	0	200	16	200	450	Average dp	Average Flow	Average volts	
2/3/2016 9:44	14.24	317.2104492	56.87	0	200	16	200	450				
2/3/2016 9:59	14.16	316.6018677	57.01	0	200	16	200	450	14.11	316.58	56.90	
2/3/2016 10:14	14.07	316.1919861	56.79	0	200	16	200	450				
2/3/2016 10:29	14.06	316.2354736	56.96	0	200	16	200	450				
2/3/2016 10:44	14.06	316.6473389	56.91	0	200	16	200	450				
2/3/2016 10:59	14.15	317.5357056	57.03	0	200	16	200	450				
2/3/2016 11:14	14.16	316.2554016	56.72	0	200	16	200	450				
2/3/2016 11:29	14.20	316.4833984	56.70	0	200	16	200	450				
2/3/2016 11:44	13.99	314.0281677	56.28	0	200	16	200	450				
2/3/2016 11:59	14.15	317.006073	56.40	0	200	16	200	450				
2/3/2016 12:14	14.32	317.0864563	56.83	0	200	16	200	450				
2/3/2016 12:29	14.17	316.503479	56.18	0	0	16	200	450	14.12	317.31	42.28	
2/3/2016 12:44	14.16	316.3639526	0.03	0	0	16	200	450				
2/3/2016 12:59	14.12	316.0639648	0.03	0	0	16	200	450				
2/3/2016 13:14	13.93	313.5877686	54.64	0	0	16	200	450				
2/3/2016 13:29	14.20	319.4709167	57.53	0	0	16	200	450				
2/3/2016 13:44	14.06	316.8587036	56.67	0	200	16	200	450				
2/3/2016 13:59	14.26	320.6643982	57.34	0	200	16	200	450				
2/3/2016 14:14	14.09	318.9646301	55.81	0	200	16	200	450				
2/3/2016 14:29	13.90	318.2307739	56.55	0	200	16	200	450				
2/3/2016 14:44	13.91	317.2648926	56.35	0	200	16	200	450				
2/3/2016 14:59	13.89	318.0776062	56.41	0	200	16	200	450				
2/3/2016 15:14	13.82	317.7071228	56.61	0	200	16	200	450				
2/3/2016 15:29	13.73	318.1021729	56.50	0	200	16	200	450				

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LIMIT MIN			38.56	96	0		0	0			
LIMIT MAX				0	96		96	96			
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02092016.xls]WESP4_Table					0		0				
				200=TitleV,0=MacWash=0, Run=200			off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL4_Venturi_D**	**CAL4_Venturi_Fl**	**wesp4_GVC_Sec**	**wesp4_ModeStatu**	**wesp4_DeviceStat**	**wesp4_IOStatus**	**CAL4_ProcStatus**	**DataQuality**			
2/9/2016 8:59	11.00	284.1963806	56.49	0	200	16	200	450			
2/9/2016 9:14	10.74	272.5091858	56.35	0	200	16	200	450	Average dp	Average Flow	Average volts
2/9/2016 9:29	11.13	283.6186523	56.43	0	200	16	200	450			
2/9/2016 9:44	11.26	283.1287537	56.44	0	200	16	200	450	11.10	269.84	55.85
2/9/2016 9:59	11.33	280.9006653	56.02	0	200	16	200	450			
2/9/2016 10:14	11.45	279.3551941	55.64	0	200	16	200	450			
2/9/2016 10:29	11.50	278.6768494	55.49	0	200	16	200	450			
2/9/2016 10:44	11.16	269.3170776	55.70	0	200	16	200	450			
2/9/2016 10:59	9.93	227.6318207	55.82	0	200	16	200	450			
2/9/2016 11:14	9.18	204.1715698	55.72	0	200	16	200	450			
2/9/2016 11:29	9.98	221.5030365	55.87	0	200	16	200	450			
2/9/2016 11:44	9.83	223.1832886	55.72	0	200	16	200	450			
2/9/2016 11:59	9.72	230.0381927	55.86	0	200	16	200	450			
2/9/2016 12:14	11.43	285.1840515	55.55	0	200	16	200	450			

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LIMIT MIN		37.95	96	4		2	0		
LIMIT MAX			0	92		94	96		
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_01262016.xls]WESP5_Table				0		2			
			200=TitleV,0=Mact Wash=0, Run=200			off=0,SU/SD=100,run=200			
24.00									
Time_Stamp	**CAL5_Venturi_DI**	**CAL5_Venturi_FI**	**wesp5_GVC_SecV**	**wesp5_ModeStatus**	**wesp5_DeviceStatu**	**wesp5_IOStatus**	**CAL5_ProcStatus**	**DataQuality**	
1/26/2016 13:59	11.71	386.0675964	55.32	0	200	16	200	450	
1/26/2016 14:14	12.73	361.6223145	53.44	0	200	16	200	450	Average dp
1/26/2016 14:29	12.49	360.7043457	50.86	0	200	16	200	450	Average Flow
1/26/2016 14:44	12.55	359.6759338	50.28	0	200	16	200	450	Average volts
1/26/2016 14:59	12.18	358.8410034	51.98	0	200	16	200	450	12.21 358.55 49.59
1/26/2016 15:14	12.13	358.6596985	49.05	0	200	16	200	450	
1/26/2016 15:29	12.24	358.6361694	49.20	0	200	16	200	450	
1/26/2016 15:44	12.03	357.4496765	49.20	0	200	16	200	450	
1/26/2016 15:59	12.14	358.0595093	47.80	0	200	16	200	450	
1/26/2016 16:14	12.13	357.4216919	47.86	0	200	16	200	450	
1/26/2016 16:29	12.22	357.6298828	46.51	0	200	16	200	450	
1/26/2016 16:44	12.09	357.4915771	48.22	0	200	16	200	450	12.33 397.35 33.98
1/26/2016 16:59	11.83	357.6703186	15.85	0	0	16	200	450	
1/26/2016 17:14	11.67	357.7156677	0.05	0	0	16	200	450	
1/26/2016 17:29	11.29	357.4052429	8.14	0	0	16	200	450	
1/26/2016 17:44	12.47	401.0337219	38.82	0	0	16	200	450	
1/26/2016 17:59	13.02	381.710144	49.81	0	200	16	200	450	
1/26/2016 18:14	12.56	396.5162048	42.23	0	200	16	200	450	
1/26/2016 18:29	12.66	437.3048706	43.42	0	200	16	200	450	
1/26/2016 18:44	12.79	440.0617676	41.09	0	200	16	200	450	
1/26/2016 18:59	12.64	440.544342	42.04	0	200	16	200	450	
1/26/2016 19:14	12.65	443.3803101	44.14	0	200	16	200	450	
1/26/2016 19:29	12.76	446.7970276	46.13	0	200	16	200	450	
1/26/2016 19:44	12.92	446.3763123	48.32	0	200	16	200	450	
1/26/2016 19:59	12.94	445.3218384	51.64	0	200	16	200	450	12.98 446.12 54.92
1/26/2016 20:14	12.98	445.0393677	54.56	0	200	16	200	450	
1/26/2016 20:29	12.94	445.9121399	55.44	0	200	16	200	450	
1/26/2016 20:44	13.04	446.3884277	56.14	0	200	16	200	450	
1/26/2016 20:59	13.05	447.3651733	55.38	0	200	16	200	450	
1/26/2016 21:14	12.94	446.6663513	56.37	0	200	16	200	450	
1/26/2016 21:29	12.74	444.9483643	56.20	0	200	16	200	450	
1/26/2016 21:44	12.61	444.5867615	56.11	0	200	16	200	450	
1/26/2016 21:59	12.58	444.1151123	56.03	0	200	16	200	450	
1/26/2016 22:14	12.88	445.8430176	56.34	0	200	16	200	450	
1/26/2016 22:29	12.84	445.7922668	56.24	0	200	16	200	450	

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LIMIT MIN			41.62	96	7		6	0				
LIMIT MAX				0	89		90	96				
U:\ENVA\Air\RTR\ICR - Stack Test\2010 ICR\Parametric Monitoring\[WESP16_M_Data_01272016.xls]WESP6_Table					0		6					
				200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200					
24.00												
Time_Stamp	**CAL6_Venturi_DP**	**CAL6_Venturi_FL**	**wesp6_GVC_SecVolt**	**wesp6_ModeStatus**	**wesp6_DeviceStatus**	**wesp6_IOStatus**	**CAL6_ProcStatus**	**DataQuality**				
1/27/2016 12:14	0.04	360.3501282	48.85	0	200	16	200	450				
1/27/2016 12:29	-0.07	359.2035522	50.24	0	200	16	200	450	Average dp	Average Flow	Average volts	
1/27/2016 12:44	-0.03	359.5548401	48.44	0	200	16	200	450				
1/27/2016 12:59	-0.22	358.4898682	50.51	0	200	16	200	450	0.07	301.65	48.87	
1/27/2016 13:14	-0.17	355.4556885	50.56	0	200	16	200	450				
1/27/2016 13:29	0.56	354.5387878	51.04	0	200	16	200	450				
1/27/2016 13:44	0.10	353.9650269	51.16	0	200	16	200	450				
1/27/2016 13:59	0.36	353.1211548	49.19	0	200	16	200	450				
1/27/2016 14:14	0.44	313.1800842	47.49	0	200	16	200	450				
1/27/2016 14:29	0.35	272.9432678	46.26	0	200	16	200	450				
1/27/2016 14:44	0.26	270.4306641	48.94	0	200	16	200	450				
1/27/2016 14:59	0.59	267.0173645	46.78	0	200	16	200	450				
1/27/2016 15:14	-0.18	265.4393005	47.70	0	200	16	200	450				
1/27/2016 15:29	-0.12	265.0967407	47.15	0	200	16	200	450				
1/27/2016 15:44	-0.43	265.9236145	48.50	0	200	16	200	450				
1/27/2016 15:59	-0.31	263.5124512	48.85	0	200	16	200	450				
1/27/2016 16:14	-0.27	263.9772339	50.01	0	200	16	200	450				
1/27/2016 16:29	-0.03	267.0525208	46.29	0	200	16	200	450				
1/27/2016 16:44	-0.11	262.7538147	47.93	0	200	16	200	450				
1/27/2016 16:59	0.12	260.6062927	47.92	0	200	16	200	450				
1/27/2016 17:14	-0.03	260.3843689	47.64	0	200	16	200	450				
1/27/2016 17:29	-0.12	260.2634277	48.04	0	200	16	200	450				
1/27/2016 17:44	0.40	260.388031	45.51	0	200	16	200	450	-0.18	338.40	25.37	
1/27/2016 17:59	0.46	260.884613	45.86	0	200	16	200	450				
1/27/2016 18:14	0.22	261.6434631	46.44	0	200	16	200	450				
1/27/2016 18:29	-0.29	263.5778198	9.63	0	0	16	200	450				
1/27/2016 18:44	-0.44	261.2591248	0.06	0	0	16	200	450				
1/27/2016 18:59	-0.43	253.2556915	0.11	0	0	16	200	450				
1/27/2016 19:14	-0.44	440.5529175	12.19	0	0	16	100	450				
1/27/2016 19:29	-0.43	465.460022	28.23	0	200	16	100	450				
1/27/2016 19:44	-0.44	461.1738892	31.71	0	200	16	100	450				
1/27/2016 19:59	-0.44	455.7711792	33.98	0	200	16	100	450				
1/27/2016 20:14	-0.44	459.3521118	44.01	0	200	16	200	450				
1/27/2016 20:29	-0.41	457.4414368	38.28	0	200	16	100	450				
1/27/2016 20:44	-0.41	456.6829834	45.68	0	200	16	100	450				
1/27/2016 20:59	-0.43	455.8738098	42.69	0	200	16	200	450				
1/27/2016 21:14	-0.44	456.3980408	42.26	0	200	16	200	450				

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LIMIT MIN			41.62	96	0		9	0			
LIMIT MAX				0	96		87	96			
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_01282016.xls]WESP6_Table					0		9				
				200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL6_Venturi_DP**	**CAL6_Venturi_FL**	**wesp6_GVC_SecVolt**	**wesp6_ModeStatus**	**wesp6_DeviceStatus**	**wesp6_IOStatus**	**CAL6_ProcStatus**	**DataQuality**			
1/28/2016 9:29	-0.44	416.320343	48.12	0	200	16	200	450	Average dp	Average Flow	Average volts
1/28/2016 9:44	-0.44	420.8109436	45.62	0	200	16	200	450			
1/28/2016 9:59	-0.44	416.6587219	50.35	0	200	16	200	450	-0.44	421.69	45.58
1/28/2016 10:14	-0.44	417.0959167	46.17	0	200	16	200	450			
1/28/2016 10:29	-0.44	421.115448	44.46	0	200	16	200	450			
1/28/2016 10:44	-0.44	422.4533997	44.83	0	200	16	200	450			
1/28/2016 10:59	-0.44	427.180542	44.32	0	200	16	200	450			
1/28/2016 11:14	-0.44	425.6403809	43.36	0	200	16	200	450			
1/28/2016 11:29	-0.44	367.6949158	37.82	0	200	16	200	450			
1/28/2016 11:44	-0.44	386.3194885	41.80	0	200	16	100	450			
1/28/2016 11:59	-0.44	387.680603	49.39	0	200	16	200	450			
1/28/2016 12:14	-0.44	385.9073486	47.99	0	200	16	200	450			
1/28/2016 12:29	-0.44	385.6487427	49.31	0	200	16	200	450			

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LIMIT MIN			37.17	96	3		0	0			
LIMIT MAX				0	93		96	96			
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02102016.xls]WESP1_Table					0		0				
				200=TitleV,0=Mac Wash=0, Run=200			off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL1_Venturi_D**	**CAL1_Venturi_F**	**WESP1_GVC_Se**	**WESP1_ModeSta**	**WESP1_DeviceSt**	**WESP1_IOStatus**	**CAL1_ProcStatus**	**DataQuality**			
2/10/2016 10:44	3.92	258.7526245	56.71	0	200	63	200	450	Average dp	Average Flow	Average volts
2/10/2016 10:59	5.62	258.0686035	56.05	0	200	63	200	450			
2/10/2016 11:14	8.19	252.7017365	56.46	0	200	63	200	450	9.14	253.93	56.26
2/10/2016 11:29	8.69	253.7298889	56.82	0	200	63	200	450			
2/10/2016 11:44	9.83	252.8040466	56.53	0	200	63	200	450			
2/10/2016 11:59	9.78	251.0621643	55.04	0	200	63	200	450			
2/10/2016 12:14	9.46	254.7485199	56.84	0	200	63	200	450			
2/10/2016 12:29	8.89	258.522583	55.89	0	200	63	200	450			
2/10/2016 12:44	7.82	258.3493042	56.48	0	200	63	200	450			
2/10/2016 12:59	7.30	258.2980347	56.34	0	200	63	200	450	7.51	258.81	56.15
2/10/2016 13:14	7.68	256.2337952	56.58	0	200	63	200	450			
2/10/2016 13:29	7.61	258.5822144	56.08	0	200	63	200	450			
2/10/2016 13:44	7.72	260.384552	56.43	0	200	63	200	450			
2/10/2016 13:59	7.54	261.8625793	55.89	0	200	63	200	450			
2/10/2016 14:14	7.21	257.4872437	55.59	0	200	63	200	450			
2/10/2016 14:29	7.26	244.4981079	56.27	0	200	63	200	450			
2/10/2016 14:44	6.42	255.3092194	56.39	0	200	63	200	450	5.02	256.54	55.91
2/10/2016 14:59	5.12	256.5794983	56.04	0	200	63	200	450			
2/10/2016 15:14	5.06	256.9254761	56.16	0	200	63	200	450			
2/10/2016 15:29	4.56	257.0950317	55.81	0	200	63	200	450			
2/10/2016 15:44	4.39	257.0889893	55.27	0	200	63	200	450			
2/10/2016 15:59	4.54	256.2302856	55.77	0	200	63	200	450			
2/10/2016 16:14	4.57	255.1434479	55.46	0	200	63	200	450			
2/10/2016 16:29	4.48	255.556488	55.78	0	200	63	200	450			
2/10/2016 16:44	4.58	255.0113068	55.91	0	200	63	200	450			
2/10/2016 16:59	4.43	254.2060547	55.68	0	200	63	200	450			
2/10/2016 17:14	4.62	254.8474426	55.07	0	200	63	200	450			

LIMIT MIN			36.78	96	1		0	0			
LIMIT MAX				0	95		96	96			
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02032016.xls]WESP2_Table					0		0				
				200=TitleV,0=Mac	Wash=0, Run=200		off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL2_Venturi_D**	**CAL2_Venturi_F**	**wesp2_GVC_Sec**	**wesp2_ModeStatu**	**wesp2_DeviceStat**	**wesp2_IOStatus**	**CAL2_ProcStatus**	**DataQuality**			
2/3/2016 13:44	8.86	282.1556702	58.01	0	200	63	200	450	Average dp	Average Flow	Average volts
2/3/2016 13:59	8.95	283.7761841	57.76	0	200	63	200	450			
2/3/2016 14:14	9.02	282.9382324	57.51	0	200	63	200	450	8.98	284.53	57.66
2/3/2016 14:29	9.23	283.8735046	57.53	0	200	63	200	450			
2/3/2016 14:44	9.05	283.2476501	57.47	0	200	63	200	450			
2/3/2016 14:59	9.03	284.849823	57.67	0	200	63	200	450			
2/3/2016 15:14	8.72	285.8150635	57.86	0	200	63	200	450			
2/3/2016 15:29	8.83	286.4745483	57.94	0	200	63	200	450			
2/3/2016 15:44	8.92	285.1524048	58.21	0	200	63	200	450			
2/3/2016 15:59	8.86	285.9041748	57.66	0	200	63	200	450			
2/3/2016 16:14	8.77	285.7659302	58.15	0	200	63	200	450			
2/3/2016 16:29	7.71	283.1392822	58.22	0	200	63	200	450			
2/3/2016 16:44	8.01	287.9154968	58.28	0	200	63	200	450			

LIMIT MIN			36.78	96	3		0	0	
LIMIT MAX				0	93		96	96	
C:\Users\david_marzec\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.Outlook\Y35TISK0\[Stack testing schedule and times 3-23-2016-2016abc.xlsx]2-12-2016 Cal TF 2 6 PM					0		0		
				200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200		
24.00									
Time_Stamp	**CAL2_Venturi_DP**	**CAL2_Venturi_FL**	**wesp2_GVC_SecVolt**	**wesp2_ModeStatus**	**wesp2_DeviceStatus**	**wesp2_IOStatus**	**CAL2_ProcStatus**	**DataQuality**	
2/12/2016 9:29	9.91	256.6082764	53.11	0	200	63	200	450	
2/12/2016 9:44	9.96	253.7470703	50.49	0	200	63	200	450	Avg
2/12/2016 9:59	10.21	263.4375305	43.98	0	200	63	200	450	dp flow volt
2/12/2016 10:14	10.32	279.388916	49.46	0	200	63	200	450	10.14 359.31 51.68
2/12/2016 10:29	10.40	281.7334595	47.09	0	200	63	200	450	
2/12/2016 10:44	8.03	161.0151367	46.46	0	200	63	200	450	
2/12/2016 10:59	10.32	441.4985352	56.48	0	200	63	200	450	
2/12/2016 11:14	10.11	496.3938904	57.27	0	200	63	200	450	
2/12/2016 11:29	11.68	495.8388062	53.31	0	200	63	200	450	
2/12/2016 11:44	13.06	493.5860291	51.85	0	200	63	200	450	
2/12/2016 11:59	11.75	491.397522	49.13	0	200	63	200	450	
2/12/2016 12:14	10.12	488.6819153	51.82	0	200	63	200	450	
2/12/2016 12:29	8.85	479.4499207	51.11	0	200	63	200	450	
2/12/2016 12:44	10.43	474.6166077	53.67	0	200	63	200	450	
2/12/2016 12:59	10.65	476.7000122	51.94	0	200	63	200	450	
2/12/2016 13:14	10.70	475.0110168	51.42	0	200	63	200	450	
2/12/2016 13:29	10.99	475.0350037	50.24	0	200	63	200	450	11.58 472.16 49.17
2/12/2016 13:44	11.32	473.3886719	50.14	0	200	63	200	450	
2/12/2016 13:59	11.54	472.0480347	48.84	0	200	63	200	450	
2/12/2016 14:14	11.71	471.2991638	48.71	0	200	63	200	450	
2/12/2016 14:29	11.89	471.9445496	48.49	0	200	63	200	450	
2/12/2016 14:44	12.04	469.2303772	48.61	0	200	63	200	450	
2/12/2016 14:59	12.13	468.1436157	48.35	0	200	63	200	450	
2/12/2016 15:14	11.65	466.0432739	48.04	0	200	63	200	450	
2/12/2016 15:29	11.71	466.0702515	47.13	0	200	63	200	450	
2/12/2016 15:44	13.14	466.0709229	46.09	0	200	63	200	450	
2/12/2016 15:59	13.79	465.3643188	46.82	0	200	63	200	450	

LIMIT MIN			40.46	96	0		0	0				
LIMIT MAX				0	96		96	96				
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02132016.xls]WESP3_Table					0		0					
				200=TitleV,0=M	Wash=0, Run=200		off=0,SU/SD=100,run=200					
24.00												
Time_Stamp	**CAL3_Venturi_**	**CAL3_Venturi_**	**wesp3_GVC_Se**	**wesp3_ModeSta**	**wesp3_DeviceSt**	**wesp3_IOStatus**	**CAL3_ProcStatu**	**DataQuality**				
2/13/2016 9:14	6.23	263.3436279	56.38	0	200	16	200	450		Average	Average	Average
2/13/2016 9:29	5.74	264.4372864	56.26	0	200	16	200	450		dp	Flow	volts
2/13/2016 9:44	5.33	263.9977112	56.03	0	200	16	200	450		4.51	263.21	56.17
2/13/2016 9:59	5.10	262.9310608	56.26	0	200	16	200	450				
2/13/2016 10:14	4.82	262.763916	56.12	0	200	16	200	450				
2/13/2016 10:29	4.44	262.953064	56.21	0	200	16	200	450				
2/13/2016 10:44	4.18	262.9348145	56.16	0	200	16	200	450				
2/13/2016 10:59	3.17	263.6678467	56.24	0	200	16	200	450				
2/13/2016 11:14	2.84	263.8062744	56.25	0	200	16	200	450				
2/13/2016 11:29	3.37	262.6755066	56.22	0	200	16	200	450				
2/13/2016 11:44	4.37	262.025116	56.17	0	200	16	200	450				
2/13/2016 11:59	4.54	262.0379333	55.80	0	200	16	200	450				
2/13/2016 12:14	3.84	264.4098816	55.88	0	200	16	200	450		3.35	262.80	56.06
2/13/2016 12:29	3.36	263.6379395	55.92	0	200	16	200	450				
2/13/2016 12:44	2.77	260.6894836	56.18	0	200	16	200	450				
2/13/2016 12:59	3.81	262.6890564	56.27	0	200	16	200	450				
2/13/2016 13:14	4.02	262.5574341	55.73	0	200	16	200	450				
2/13/2016 13:29	2.92	262.5354919	56.16	0	200	16	200	450				
2/13/2016 13:44	2.75	263.0537415	56.26	0	200	16	200	450				
2/13/2016 13:59	3.36	262.9517212	56.11	0	200	16	200	450				
2/13/2016 14:14	4.37	262.9113464	56.26	0	200	16	200	450				
2/13/2016 14:29	5.10	261.9981384	56.02	0	200	16	200	450		3.36	264.70	55.98
2/13/2016 14:44	4.74	265.6896973	55.70	0	200	16	200	450				
2/13/2016 14:59	3.48	264.401062	55.97	0	200	16	200	450				
2/13/2016 15:14	2.83	264.5167542	56.11	0	200	16	200	450				
2/13/2016 15:29	2.23	265.849823	56.07	0	200	16	200	450				
2/13/2016 15:44	1.76	265.7612915	55.98	0	200	16	200	450				
2/13/2016 15:59	0.90	266.8441467	56.12	0	200	16	200	450				
2/13/2016 16:14	-0.17	265.9757385	56.01	0	200	16	200	450				
2/13/2016 16:29	-0.45	264.9497375	56.28	0	200	16	200	450				
2/13/2016 16:44	-0.45	265.7679749	56.39	0	200	16	200	450				
2/13/2016 16:59	-0.45	266.2586975	56.16	0	200	16	200	450				

LIMIT MIN			38.56	96	4		0	0			
LIMIT MAX				0	92		96	96			
U:\ENVA\Air\RTR\ICR - Stack Test\2010 ICR\Parametric Monitoring\[WESP16_M_Data_02012016.xls]WESP4_Table					0		0				
				200=TitleV,0=Mac	Wash=0, Run=200		off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL4_Venturi_D**	**CAL4_Venturi_F**	**wesp4_GVC_Sec**	**wesp4_ModeStatu**	**wesp4_DeviceStat**	**wesp4_IOStatus**	**CAL4_ProcStatus**	**DataQuality**			
2/1/2016 12:14	-0.45	319.944519	57.30	0	200	16	200	450	Average dp	Average Flow	Average volts
2/1/2016 12:29	-0.45	323.9185791	57.90	0	200	16	200	450			
2/1/2016 12:44	-0.45	321.8739014	57.85	0	200	16	200	450	0.45	323.10	57.96
2/1/2016 12:59	-0.45	324.3770142	58.11	0	200	16	200	450			
2/1/2016 13:14	-0.45	322.354126	57.84	0	200	16	200	450			
2/1/2016 13:29	-0.45	323.0058289	57.96	0	200	16	200	450			
2/1/2016 13:44	-0.45	324.5963745	58.11	0	200	16	200	450			
2/1/2016 13:59	-0.45	322.3806458	57.89	0	200	16	200	450			
2/1/2016 14:14	-0.45	323.7549744	58.03	0	200	16	200	450			
2/1/2016 14:29	-0.45	322.3956299	57.68	0	200	16	200	450	13.43	321.64	57.65
2/1/2016 14:44	-0.45	321.2975769	57.92	0	200	16	200	450			
2/1/2016 14:59	-0.45	322.8255005	57.83	0	200	16	200	450			
2/1/2016 15:14	-0.45	322.9447632	57.84	0	200	16	200	450			
2/1/2016 15:29	-0.45	323.8586731	57.98	0	200	16	200	450			
2/1/2016 15:44	0.10	321.8209839	57.67	0	200	16	200	450			
2/1/2016 15:59	-0.45	321.3792419	57.25	0	200	16	200	450			
2/1/2016 16:14	-0.45	322.0119019	57.27	0	200	16	200	450			
2/1/2016 16:29	5.58	320.6730652	57.54	0	200	16	200	450			
2/1/2016 16:44	9.14	321.9713135	57.81	0	200	16	200	450			
2/1/2016 16:59	13.14	319.5913086	57.02	0	200	16	200	450			
2/1/2016 17:14	13.72	323.6791382	58.01	0	200	16	200	450			
2/1/2016 17:29	13.53	321.0500488	57.81	0	200	16	200	450	14.00	319.67	57.54
2/1/2016 17:44	13.70	322.1691895	57.86	0	200	16	200	450			
2/1/2016 17:59	14.02	316.9785156	57.20	0	200	16	200	450			
2/1/2016 18:14	14.22	319.1817017	57.59	0	200	16	200	450			
2/1/2016 18:29	14.16	317.994751	57.12	0	200	16	200	450			
2/1/2016 18:44	14.39	320.625061	57.69	0	200	16	200	450			
2/1/2016 18:59	14.22	319.2285767	57.28	0	200	16	200	450			
2/1/2016 19:14	14.50	321.3409119	57.69	0	200	16	200	450			
2/1/2016 19:29	14.51	320.4385376	57.55	0	200	16	200	450			
2/1/2016 19:44	14.38	319.7770691	57.38	0	200	16	200	450			
2/1/2016 19:59	14.21	319.3372192	57.18	0	200	16	200	450			

LIMIT MIN			37.95	96	4		5	0				
LIMIT MAX				0	92		91	96				
U:\ENVA\Air\RTR\ICR - Stack Test\2010 ICR\Parametric Monitoring\[WESP16_M_Data_01272016.xls]WESP5_Table					0		5					
				200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200					
24.00												
Time_Stamp	**CAL5_Venturi_DP**	**CAL5_Venturi_FL**	**wesp5_GVC_SecVo**	**wesp5_ModeStatus**	**wesp5_DeviceStatu**	**wesp5_IOStatus**	**CAL5_ProcStatus**	**DataQuality**				
1/27/2016 0:14	12.34	443.3855591	55.54	0	200	16	200	450				
1/27/2016 11:14	12.11	380.8037415	55.78	0	200	16	200	450	Average dp	Average Flow	Average volts	
1/27/2016 11:29	11.80	384.8260498	50.93	0	200	16	200	450				
1/27/2016 11:44	11.54	383.943573	49.66	0	200	16	200	450	11.17	374.09	46.57	
1/27/2016 11:59	11.42	383.9141541	51.35	0	200	16	200	450				
1/27/2016 12:14	11.06	371.958313	50.29	0	200	16	200	450				
1/27/2016 12:29	11.21	371.1896057	46.16	0	200	16	200	450				
1/27/2016 12:44	11.21	371.2919312	44.63	0	200	16	200	450				
1/27/2016 12:59	11.03	369.9322815	45.08	0	200	16	200	450				
1/27/2016 13:14	11.00	370.3465576	43.56	0	200	16	200	450				
1/27/2016 13:29	10.88	370.178833	41.83	0	200	16	200	450				
1/27/2016 13:44	11.13	369.3167725	43.01	0	200	16	200	450	11.12	368.52	43.73	
1/27/2016 13:59	11.28	369.4450378	44.06	0	200	16	200	450				
1/27/2016 14:14	11.46	369.4263306	44.38	0	200	16	200	450				
1/27/2016 14:29	11.24	368.2403259	45.28	0	200	16	200	450				
1/27/2016 14:44	10.81	367.0921936	46.09	0	200	16	200	450				
1/27/2016 14:59	10.82	367.5924072	39.55	0	200	16	200	450				
1/27/2016 15:14	7.97	231.5898743	13.16	0	0	16	200	450				
1/27/2016 15:29	5.65	128.4108582	0.04	0	0	16	200	450				
1/27/2016 15:44	7.63	209.8193054	30.63	0	0	16	200	450				
1/27/2016 15:59	2.62	-54.97972488	41.00	0	0	16	200	450				
1/27/2016 16:14	2.84	5.265529633	41.92	0	200	16	100	450	9.57	331.71	53.21	
1/27/2016 16:29	9.60	389.239563	53.72	0	200	16	100	450				
1/27/2016 16:44	10.90	385.243927	54.80	0	200	16	200	450				
1/27/2016 16:59	10.92	385.8101501	55.11	0	200	16	200	450				
1/27/2016 17:14	10.97	385.7574768	55.58	0	200	16	200	450				
1/27/2016 17:29	10.99	385.5800781	55.67	0	200	16	200	450				
1/27/2016 17:44	10.79	385.0992126	55.67	0	200	16	200	450				
1/27/2016 17:59	10.69	384.7618103	55.53	0	200	16	200	450				
1/27/2016 18:14	10.60	384.484436	55.30	0	200	16	200	450				
1/27/2016 18:29	10.49	384.7272339	55.73	0	200	16	200	450				
1/27/2016 18:44	10.43	385.1109619	55.84	0	200	16	200	450				
1/27/2016 18:59	10.18	383.2653503	55.80	0	200	16	200	450				

LIMIT MIN			41.62	96	2		0	0			
LIMIT MAX				0	94		96	96			
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_01262016.xls]WESP6_Table					0		0				
				200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL6_Venturi_DP**	**CAL6_Venturi_FL**	**wesp6_GVC_SecVo**	**wesp6_ModeStatus**	**wesp6_DeviceStatu**	**wesp6_IOStatus**	**CAL6_ProcStatus**	**DataQuality**			
1/26/2016 13:59	6.87	309.1962891	50.35	0	200	16	200	450			
1/26/2016 14:14	7.08	311.5437012	47.90	0	200	16	200	450	Average dp	Average Flow	Average volts
1/26/2016 14:29	6.92	309.4353333	50.00	0	200	16	200	450			
1/26/2016 14:44	6.78	296.2180481	48.15	0	200	16	200	450	6.51	284.13	49.66
1/26/2016 14:59	6.72	284.6438599	49.40	0	200	16	200	450			
1/26/2016 15:14	6.31	284.5022888	50.33	0	200	16	200	450			
1/26/2016 15:29	6.47	281.5246277	49.81	0	200	16	200	450			
1/26/2016 15:44	6.41	280.2870178	50.73	0	200	16	200	450			
1/26/2016 15:59	6.37	277.6039124	49.54	0	200	16	200	450			
1/26/2016 16:14	6.39	273.0499268	48.67	0	200	16	200	450			
1/26/2016 16:29	6.12	277.58255	49.66	0	200	16	200	450			
1/26/2016 16:44	6.12	276.6861572	50.61	0	200	16	200	450	5.62	276.42	49.02
1/26/2016 16:59	5.84	277.0177307	49.40	0	200	16	200	450			
1/26/2016 17:14	5.74	278.0146484	48.18	0	200	16	200	450			
1/26/2016 17:29	5.60	276.7490845	49.68	0	200	16	200	450			
1/26/2016 17:44	5.81	275.5645447	47.39	0	200	16	200	450			
1/26/2016 17:59	5.57	275.2138977	48.81	0	200	16	200	450			
1/26/2016 18:14	4.69	275.7106934	49.05	0	200	16	200	450			
1/26/2016 18:29	3.75	275.6710815	52.22	0	200	16	200	450			
1/26/2016 18:44	3.58	274.456543	52.03	0	200	16	200	450			
1/26/2016 18:59	3.57	274.0357361	51.89	0	200	16	200	450	4.30	274.66	49.41
1/26/2016 19:14	4.28	273.7733765	49.64	0	200	16	200	450			
1/26/2016 19:29	4.53	274.885498	47.84	0	200	16	200	450			
1/26/2016 19:44	4.44	276.3596497	49.89	0	200	16	200	450			
1/26/2016 19:59	4.43	274.9865417	50.10	0	200	16	200	450			
1/26/2016 20:14	4.57	274.6878967	47.81	0	200	16	200	450			
1/26/2016 20:29	4.29	273.8627625	48.73	0	200	16	200	450			
1/26/2016 20:44	4.16	274.2316895	48.99	0	200	16	200	450			
1/26/2016 20:59	4.45	274.321228	49.73	0	200	16	200	450			
1/26/2016 21:14	4.38	274.7125244	48.73	0	200	16	200	450			
1/26/2016 21:29	4.31	275.0152893	48.05	0	200	16	200	450			
1/26/2016 21:44	3.43	275.4522705	50.72	0	200	16	200	450			

LIMIT MIN			37.17	96	3		0	0				
LIMIT MAX				0	93		96	96				
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02112016.xls]WESP1_Table					0		0					
				200=TitleV,0=Mac	Wash=0, Run=200		off=0,SU/SD=100,run=200					
24.00												
Time_Stamp	**CAL1_Venturi_D**	**CAL1_Venturi_F**	**WESP1_GVC_Se**	**WESP1_ModeSta**	**WESP1_DeviceSt**	**WESP1_IOStatus**	**CAL1_ProcStatus**	**DataQuality**				
2/11/2016 9:44	20.17	251.1082458	56.22	0	200	63	200	450				
2/11/2016 9:59	20.42	250.4251862	55.61	0	200	63	200	450	Average dp	Average Flow	Average volts	
2/11/2016 10:14	20.67	249.8616486	54.64	0	200	63	200	450				
2/11/2016 10:29	20.34	250.1308899	54.11	0	200	63	200	450	20.14	250.19	55.34	
2/11/2016 10:44	20.39	249.7713928	55.54	0	200	63	200	450				
2/11/2016 10:59	20.16	250.2320709	55.61	0	200	63	200	450				
2/11/2016 11:14	19.78	249.891983	55.70	0	200	63	200	450				
2/11/2016 11:29	20.03	250.9060974	55.73	0	200	63	200	450				
2/11/2016 11:44	19.97	250.9214783	56.09	0	200	63	200	450				
2/11/2016 11:59	19.85	250.9376373	54.60	0	200	63	200	450	19.85	250.00	55.16	
2/11/2016 12:14	19.80	250.319809	55.26	0	200	63	200	450				
2/11/2016 12:29	19.84	249.8757172	55.21	0	200	63	200	450				
2/11/2016 12:44	19.71	249.7145996	55.61	0	200	63	200	450				
2/11/2016 12:59	20.08	249.1447906	55.12	0	200	63	200	450				
2/11/2016 13:14	20.11	248.7480011	55.80	0	200	63	200	450				
2/11/2016 13:29	20.05	248.5127258	55.81	0	200	63	200	450	19.96	248.55	55.33	
2/11/2016 13:44	20.15	248.7475586	55.28	0	200	63	200	450				
2/11/2016 13:59	19.96	248.709137	55.10	0	200	63	200	450				
2/11/2016 14:14	19.84	248.6884308	54.85	0	200	63	200	450				
2/11/2016 14:29	19.79	248.1073456	55.58	0	200	63	200	450				
2/11/2016 14:44	20.14	248.2310638	55.16	0	200	63	200	450				
2/11/2016 14:59	20.15	247.8700867	55.65	0	200	63	200	450				
2/11/2016 15:14	20.33	249.3988495	54.85	0	200	63	200	450				
2/11/2016 15:29	20.60	252.7215424	54.69	0	200	63	200	450				
2/11/2016 15:44	20.39	252.7888641	54.07	0	200	63	200	450				

LIMIT MIN		36.78	96	3		0	0	
LIMIT MAX			0	93		96	96	
P:\Common_Projects\Field Measurements\Project Folders\P-T\PCS Phosphate\2016\Calciners Jan Testing\Compliance\Feed Informationfrom PCS\[Copy of Stac				0		0		
			200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200		
24.00								

Time_Stamp	CAL2_Venturi_DP	CAL2_Venturi_FL	wesp2_GVC_SecVolt	wesp2_ModeStatus	wesp2_DeviceStatus	wesp2_IOStatus	CAL2_ProcStatus	DataQuality			
2/13/2016 10:29	6.86	290.6651306	43.53	0	200	63	200	450	Average dp	Average Flow	Average volts
2/13/2016 10:44	5.61	280.9512024	43.51	0	200	63	200	450			
2/13/2016 10:59	8.75	282.5804138	43.69	0	200	63	200	450	9.08	284.79	44.41
2/13/2016 11:14	8.91	284.8589478	44.30	0	200	63	200	450			
2/13/2016 11:29	9.55	285.1002808	43.62	0	200	63	200	450			
2/13/2016 11:44	9.58	285.0424194	43.61	0	200	63	200	450			
2/13/2016 11:59	8.62	286.3757935	46.83	0	200	63	200	450			
2/13/2016 12:14	9.87	279.8141174	43.31	0	200	63	200	450			
2/13/2016 12:29	10.32	275.3161926	42.29	0	200	63	200	450			
2/13/2016 12:44	9.80	276.3125916	43.58	0	200	63	200	450	9.47	278.01	43.39
2/13/2016 12:59	9.97	277.3450012	43.53	0	200	63	200	450			
2/13/2016 13:14	10.02	277.706604	42.81	0	200	63	200	450			
2/13/2016 13:29	9.43	278.7950439	44.16	0	200	63	200	450			
2/13/2016 13:44	8.15	279.8729553	42.85	0	200	63	200	450			
2/13/2016 13:59	8.70	280.8685608	42.82	0	200	63	200	450			
2/13/2016 14:14	8.24	281.2093506	43.40	0	200	63	200	450			
2/13/2016 14:29	8.50	282.0545959	42.36	0	200	63	200	450	7.89	282.92	42.82
2/13/2016 14:44	6.01	282.0765381	42.81	0	200	63	200	450			
2/13/2016 14:59	6.92	283.8583374	43.08	0	200	63	200	450			
2/13/2016 15:14	8.51	283.6979065	42.82	0	200	63	200	450			
2/13/2016 15:29	9.50	282.9277344	43.04	0	200	63	200	450			
2/13/2016 15:44	9.44	283.8655396	43.68	0	200	63	200	450			
2/13/2016 15:59	10.35	342.5272827	43.34	0	200	63	200	450			
2/13/2016 16:14	9.29	366.7206116	44.72	0	200	63	200	450			
2/13/2016 16:29	8.40	391.7495117	44.69	0	200	63	200	450			
2/13/2016 16:44	8.80	393.0188599	43.49	0	200	63	200	450			

LIMIT MIN			36.78	96	3		0	0					
LIMIT MAX				0	93		96	96					
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_01302016.xls]WESP2_Table					0		0						
				200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200						
24.00													
Time_Stamp	**CAL2_Venturi_DP**	**CAL2_Venturi_FL**	**wesp2_GVC_SecVolt**	**wesp2_ModeStatus**	**wesp2_DeviceStatus**	**wesp2_IOStatus**	**CAL2_ProcStatus**	**DataQuality**					
1/30/2016 9:59	9.42	276.2845764	58.36	0	200	63	200	450					
1/30/2016 10:14	8.51	276.7911072	58.45	0	200	63	200	450					
1/30/2016 10:29	8.04	276.017334	58.21	0	200	63	200	450	Average	Average	Average		
1/30/2016 10:44	7.96	279.2853699	8.45	0	0	63	200	450	dp	Flow	volts		
1/30/2016 10:59	7.92	282.6581726	0.03	0	0	63	200	450	7.92	281.43	39.83		
1/30/2016 11:14	7.66	281.4541931	37.53	0	0	63	200	450					
1/30/2016 11:29	8.59	280.8525085	49.78	0	200	63	200	450					
1/30/2016 11:44	7.87	281.2110901	54.64	0	200	63	200	450					
1/30/2016 11:59	7.57	280.960083	57.18	0	200	63	200	450					
1/30/2016 12:14	7.75	278.8018799	57.89	0	200	63	200	450	8.16	277.36	57.50		
1/30/2016 12:29	7.55	277.7067566	57.92	0	200	63	200	450					
1/30/2016 12:44	8.56	277.2828979	57.95	0	200	63	200	450					
1/30/2016 12:59	9.53	276.6105652	57.48	0	200	63	200	450					
1/30/2016 13:14	7.43	276.4066162	56.26	0	200	63	200	450					
1/30/2016 13:29	7.48	275.2250366	57.23	0	200	63	200	450					
1/30/2016 13:44	8.37	271.8681641	57.49	0	200	63	200	450					
1/30/2016 13:59	8.38	280.3705444	57.32	0	200	63	200	450					
1/30/2016 14:14	7.35	271.9503174	57.41	0	200	63	200	450					
1/30/2016 14:29	7.57	267.8730469	54.95	0	200	63	200	450	7.56	273.12	55.19		
1/30/2016 14:44	7.57	269.8012695	55.28	0	200	63	200	450					
1/30/2016 14:59	7.67	274.8222351	55.22	0	200	63	200	450					
1/30/2016 15:14	7.55	275.2582703	54.92	0	200	63	200	450					
1/30/2016 15:29	7.54	275.5130005	54.53	0	200	63	200	450					
1/30/2016 15:44	7.47	275.4533081	56.27	0	200	63	200	450					
1/30/2016 15:59	7.30	274.7626343	56.69	0	200	63	200	450					
1/30/2016 16:14	7.38	274.8636169	55.94	0	200	63	200	450					
1/30/2016 16:29	7.35	276.5568542	56.37	0	200	63	200	450					
1/30/2016 16:44	8.35	276.863678	57.65	0	200	63	200	450					
1/30/2016 16:59	8.42	271.1066284	58.43		200	63	200	450					

For Informational Purposes Only

LIMIT MIN			40.46	96	4		0	0				
LIMIT MAX				0	92		96	96				
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02112016.xls]WESP3_Table					0		0					
				200=TitleV,0=Mac	Wash=0, Run=200		off=0,SU/SD=100,run=200					
24.00												
Time_Stamp	**CAL3_Venturi_D**	**CAL3_Venturi_F**	**wesp3_GVC_Sec**	**wesp3_ModeStatu**	**wesp3_DeviceStat**	**wesp3_IOStatus**	**CAL3_ProcStatus**	**DataQuality**				
2/11/2016 15:44	10.68	252.8739166	55.81	0	200	16	200	450		Average	Average	Average
2/11/2016 15:59	9.81	253.3942261	56.14	0	200	16	200	450		dp	Flow	volts
2/11/2016 16:14	10.14	253.3753052	56.07	0	200	16	200	450		10.38	253.35	55.95
2/11/2016 16:29	10.26	253.7281647	56.18	0	200	16	200	450				
2/11/2016 16:44	10.38	253.1803894	56.22	0	200	16	200	450				
2/11/2016 16:59	10.54	252.9416809	55.83	0	200	16	200	450				
2/11/2016 17:14	10.60	253.5380096	55.44	0	200	16	200	450				
2/11/2016 17:29	10.19	253.628418	55.78	0	200	16	200	450				
2/11/2016 17:44	10.10	253.7892609	55.83	0	200	16	200	450		10.02	253.38	56.19
2/11/2016 17:59	10.09	253.2442322	56.17	0	200	16	200	450				
2/11/2016 18:14	9.98	252.9442291	56.39	0	200	16	200	450				
2/11/2016 18:29	10.07	253.3796692	56.36	0	200	16	200	450				
2/11/2016 18:44	9.88	253.5512695	56.22	0	200	16	200	450				
2/11/2016 18:59	9.56	253.4882355	56.15	0	200	16	200	450		9.51	253.25	56.29
2/11/2016 19:14	9.50	253.6296387	56.20	0	200	16	200	450				
2/11/2016 19:29	9.57	253.1040344	56.18	0	200	16	200	450				
2/11/2016 19:44	9.64	252.8720093	56.50	0	200	16	200	450				
2/11/2016 19:59	9.26	253.1803589	56.41	0	200	16	200	450				
2/11/2016 20:14	9.31	253.1696777	56.37	0	200	16	200	450				
2/11/2016 20:29	9.64	252.7218475	56.50	0	200	16	200	450				
2/11/2016 20:44	10.03	253.0273895	56.31	0	200	16	200	450				
2/11/2016 20:59	10.06	253.2677307	56.18	0	200	16	200	450				
2/11/2016 21:14	9.78	253.4777222	56.18	0	200	16	200	450				

LIMIT MIN			38.56	96	4		0	0		
LIMIT MAX				0	92		96	96		
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02102016.xls]WESP4_Table					0		0			
				200=TitleV,0=Ma	Wash=0, Run=200		off=0,SU/SD=100,run=200			
24.00										
Time_Stamp	**CAL4_Venturi_D**	**CAL4_Venturi_F**	**wesp4_GVC_Sec**	**wesp4_ModeStatu**	**wesp4_DeviceSta**	**wesp4_IOStatus**	**CAL4_ProcStatu**	**DataQuality**		
2/10/2016 11:59	5.93	333.4341736	55.46	0	200	16	200	450	Average dp	Average Flow	Average volts
2/10/2016 12:14	4.51	323.917511	55.80	0	200	16	200	450			
2/10/2016 12:29	3.33	323.7633057	55.74	0	200	16	200	450	1.80	325.06	55.93
2/10/2016 12:44	2.02	325.1846924	56.01	0	200	16	200	450			
2/10/2016 12:59	1.18	327.8613281	56.11	0	200	16	200	450			
2/10/2016 13:14	1.25	325.7514343	55.85	0	200	16	200	450			
2/10/2016 13:29	1.22	322.71698	55.93	0	200	16	200	450			
2/10/2016 13:44	1.17	304.422699	56.06	0	200	16	200	450	5.48	316.44	56.04
2/10/2016 13:59	4.63	283.3865662	56.23	0	200	16	200	450			
2/10/2016 14:14	7.07	331.3538513	56.05	0	200	16	200	450			
2/10/2016 14:29	7.19	331.3825378	55.99	0	200	16	200	450			
2/10/2016 14:44	7.33	331.6476746	55.89	0	200	16	200	450			
2/10/2016 14:59	7.54	334.4973755	56.06	0	200	16	200	450	7.76	333.23	55.87
2/10/2016 15:14	7.68	334.4176636	55.71	0	200	16	200	450			
2/10/2016 15:29	7.66	331.0709839	55.93	0	200	16	200	450			
2/10/2016 15:44	7.90	332.5897827	55.86	0	200	16	200	450			
2/10/2016 15:59	8.04	333.5845337	55.79	0	200	16	200	450			
2/10/2016 16:14	8.00	332.5674438	55.84	0	200	16	200	450			
2/10/2016 16:29	8.04	331.5926514	55.80	0	200	16	200	450			
2/10/2016 16:44	8.00	334.7771606	55.88	0	200	16	200	450			
2/10/2016 16:59	7.98	334.8189087	55.56	0	200	16	200	450			
2/10/2016 17:14	8.13	335.7671509	55.87	0	200	16	200	450			

LIMIT MIN			37.95	96	0		0	0			
LIMIT MAX				0	96		96	96			
R:\envir\MACT_DATA\WESP\[WESP16_M_Data_02082016.xls]WESP5_Table					0		0				
				200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200				
24.00											
Time_Stamp	**CAL5_Venturi_DP**	**CAL5_Venturi_FL**	**wesp5_GVC_SecVolt**	**wesp5_ModeStatus**	**wesp5_DeviceStatus**	**wesp5_IOStatus**	**CAL5_ProcStatus**	**DataQuality**			
2/8/2016 13:29	16.90	493.9317627	57.16	0	200	16	200	450			
2/8/2016 13:44	16.83	494.3588257	57.11	0	200	16	200	450	Average dp	Average Flow	Average volts
2/8/2016 13:59	17.06	495.0139465	57.09	0	200	16	200	450			
2/8/2016 14:14	16.74	494.3547974	56.84	0	200	16	200	450	17.01	494.84	57.04
2/8/2016 14:29	17.14	495.0810852	57.23	0	200	16	200	450			
2/8/2016 14:44	16.88	494.4953003	56.82	0	200	16	200	450			
2/8/2016 14:59	17.17	495.676178	57.09	0	200	16	200	450			
2/8/2016 15:14	17.10	494.6115417	57.21	0	200	16	200	450			
2/8/2016 15:29	17.04	495.4571838	57.12	0	200	16	200	450	17.18	495.17	57.11
2/8/2016 15:44	17.17	495.1403809	57.05	0	200	16	200	450			
2/8/2016 15:59	17.27	495.2221069	56.89	0	200	16	200	450			
2/8/2016 16:14	17.24	494.8566284	57.27	0	200	16	200	450			
2/8/2016 16:29	17.16	495.1726685	57.24	0	200	16	200	450			
2/8/2016 16:44	17.16	495.1500244	57.32	0	200	16	200	450	16.99	495.23	57.13
2/8/2016 16:59	17.23	495.5868835	57.31	0	200	16	200	450			
2/8/2016 17:14	16.92	495.8738098	57.28	0	200	16	200	450			
2/8/2016 17:29	16.96	494.6351318	56.92	0	200	16	200	450			
2/8/2016 17:44	16.66	494.9187012	56.83	0	200	16	200	450			
2/8/2016 17:59	16.68	494.2401123	56.64	0	200	16	200	450			
2/8/2016 18:14	16.37	494.3402405	56.74	0	200	16	200	450			
2/8/2016 18:29	16.35	493.9665222	56.69	0	200	16	200	450			
2/8/2016 18:44	16.38	493.6100769	56.73	0	200	16	200	450			
2/8/2016 18:59	16.18	492.9337158	56.70	0	200	16	200	450			

LIMIT MIN		41.62	96	4		0	0	
LIMIT MAX			0	92		96	96	
P:\Common_Projects\Field Measurements\Project Folders\P-T\PCS Phosphate\2016\Calciners Jan Testing\Compliance\Feed Informationfrom PCS\[Copy of Stac				0		0		
			200=TitleV,0=Mact	Wash=0, Run=200		off=0,SU/SD=100,run=200		
24.00								

Time_Stamp	CAL6_Venturi_DP	CAL6_Venturi_FL	wesp6_GVC_SecVolt	wesp6_ModeStatus	wesp6_DeviceStatus	wesp6_IOStatus	CAL6_ProcStatus	DataQuality				
2/19/2016 10:44	7.96	295.069519	50.26	0	200	16	200	450				
2/19/2016 10:59	7.98	296.3065186	46.01	0	200	16	200	450	Average dp	Average Flow	Average volts	
2/19/2016 11:14	7.84	296.8320007	44.45	0	200	16	200	450				
2/19/2016 11:29	8.02	297.2509155	45.11	0	200	16	200	450	8.05	297.58	46.92	
2/19/2016 11:44	8.08	296.3667908	45.40	0	200	16	200	450				
2/19/2016 11:59	7.92	296.2422485	47.14	0	200	16	200	450				
2/19/2016 12:14	8.10	298.2344666	49.41	0	200	16	200	450				
2/19/2016 12:29	8.14	299.7904968	47.56	0	200	16	200	450				
2/19/2016 12:44	7.97	301.1985779	48.53	0	200	16	200	450				
2/19/2016 12:59	7.86	301.1803589	49.36	0	200	16	200	450	7.83	300.37	48.56	
2/19/2016 13:14	7.91	298.7610168	48.51	0	200	16	200	450				
2/19/2016 13:29	7.77	300.9979553	49.64	0	200	16	200	450				
2/19/2016 13:44	7.78	300.3608398	48.04	0	200	16	200	450				
2/19/2016 13:59	7.82	300.572052	47.24	0	200	16	200	450	7.69	295.37	46.01	
2/19/2016 14:14	7.59	293.3833313	46.03	0	200	16	200	450				
2/19/2016 14:29	7.72	288.9813538	45.09	0	200	16	200	450				
2/19/2016 14:44	7.49	295.0922852	46.15	0	200	16	200	450				
2/19/2016 14:59	7.83	298.8062134	45.53	0	200	16	200	450				
2/19/2016 15:14	8.66	542.8014526	47.42	0	200	16	200	450				
2/19/2016 15:29	9.34	602.9814453	48.13	0	200	16	200	450				
2/19/2016 15:44	9.07	602.1797485	50.59	0	200	16	200	450				
2/19/2016 15:59	9.12	603.2844238	47.83	0	200	16	200	450				
2/19/2016 16:14	9.32	602.4868164	47.91	0	200	16	200	450				

APPENDIX C
EQUIPMENT CALIBRATIONS

PCS Phosphate
2/10/2016
Calciner # 1
Post Test Meter Calibration Check
Meter No. N-45

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (γ_{da})**
1	1.0310
2	1.0103
3	1.0231
Average	1.0215
Initial Meter γ	0.9943
Deviation	2.7%

Must be less than 5%

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00545

PCS Phosphate
2/13/2016
Calciner # 3
Post Test Meter Calibration Check
Meter No. N-54

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (γ_{da})**	
1	1.0219	
2	1.0394	
3	1.0404	
Average	1.0339	
Initial Meter γ	1.0189	
Deviation	1.5%	Must be less than 5%

PCS Phosphate

2/3/2016

Calciner # 2

Post Test Meter Calibration Check

Meter No. N-54

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (γ_{da})**
1	1.0032
2	0.9863
3	1.0057
Average	0.9984
Initial Meter γ	0.9782
Deviation	2.1%

Must be less than 5%

PCS Phosphate
2/1/2016
Calciner # 4
Post Test Meter Calibration Check
Meter No. N-55

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (γ_{qa})**
1	1.0299
2	1.0012
3	1.0003
Average	1.0105
Initial Meter γ	1.0189
Deviation	0.8%

Must be less than 5%

PCS Phosphate
1/27/2015
Calciner # 5
Post Test Meter Calibration Check
Meter No. N-44

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (Y_{qa})**	
1	0.9970	
2	0.9915	
3	0.9897	
Average	0.9927	
Initial Meter	1.0266	
Deviation	3.3%	Must be less than 5%

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00549

PCS Phosphate
1/26/2016
Calciner # 6
Post Test Meter Calibration Check
Meter No. N-45

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (Y_{qa})**	
1	1.0287	
2	1.0291	
3	1.0173	
Average	1.0251	
Initial Meter Y	0.9943	
Deviation	3.1%	Must be less than 5%

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00550

PCS Phosphate
2/1/2016
Calciner # 2
Post Test Meter Calibration Check
Meter No. N-54

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (γ_{da})**
2	1.0545
3	1.0433
4	1.0731
Average	1.0570
Initial Meter γ	0.9978
Deviation	5.9%

Must be less than 5%

PCS Phosphate
2/23/2016
Calciner # 2
Post Test Meter Calibration Check
Meter No. N-54

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (J_{qa})**
2	1.0042
3	0.9936
4	1.0220
Average	1.0066
Initial Meter J	0.9782
Deviation	2.9%

Must be less than 5%

PCS Phosphate
2/3/2016
Calciner # 4
Post Test Meter Calibration Check
Meter No. N-55

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (Y_{qa})**
1	1.0142
2	1.0080
3	1.0030
Average	1.0084
Initial Meter	1.0189
Deviation	1.0%

Must be less than 5%

PCS Phosphate
1/26/2016
Calciner # 5
Post Test Meter Calibration Check
Meter No. N-44

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (Y_{qa})**
1	0.9944
2	1.0008
3	1.0204
Average	1.0052
Initial Meter Y	1.0266
Deviation	2.1%

Must be less than 5%

PCS Phosphate
1/27/2016
Calciner # 6
Post Test Meter Calibration Check
Meter No. N-45

Per EPA EMTIC Guideline Document 26:
Alternative Post-Test Calibration

Run	**Post Test Meter QA (Y_{qa})**
1	0.9934
2	0.9993
3	1.0030
Average	0.9986
Initial Meter Y	0.9943
Deviation	0.4%

Must be less than 5%

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00555

Praxair Distribution Mid-Atlantic
One Steel Road East
Morrisville, PA 19067
Tel:(800)638-6320 Fax:(215)736-5240
PGVP ID: F32014

DocNumber: 000008557

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PDI WHSE RALEIGH
2807 GRESHAM LAKE RD
RALEIGH NC 276160000

Praxair Order Number: 04939769
Customer PO Number: --None-- 991
Customer Reference Number:

Fill Date: 5/20/2014
Part Number: NI CD20.5O2E-AS
Lot Number: 301613140403
Cylinder Style and Outlet: AS CGA 590
Cylinder Pressure and Volume: 2000 psig 157 cu. ft.

Certified Concentration:

Expiration Date: 05/28/2022		Cylinder Number: CC102927	NIST Traceable Analytical Uncertainty:
20.76	**%**	**CARBON DIOXIDE**	**± 0.2 %**
19.26	**%**	**OXYGEN**	**± 0.1 %**
	Balance	**NITROGEN**	

Certification Information:

Certification Date : 5/28/2014 *Term :* 96 Months *Expiration Date :* 05/28/2022

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1.
Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data:

(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)

1 . Component: **CARBON DIOXIDE**

Requested Concentration: 20.5 %
Certified Concentration: 20.76 %
Instrument Used: SIEMENS ULTRAMAT 5E SN: D2-412
Analytical Method: NON-DISPERSIVE INFRARED
Last Multipoint Calibration: 05/21/2014

Reference Standard Type: GMIS
Ref. Std. Cylinder #: CC182173
Ref. Std. Conc: 19.90 %
Ref. Std. traceable to SRM #: 2745a
SRM Sample #: 9-7-34
SRM Cylinder #: CAL016129

First Analysis Data:						Date:	05/28/2014
Z:	0	R:	19.9	C:	20.74	Conc:	20.74
R:	19.89	Z:	0	C:	20.77	Conc:	20.77
Z:	0	C:	20.77	R:	19.89	Conc:	20.77
UOM:	%					Mean Test Assay:	20.76 %

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%					Mean Test Assay:	0 %

2 . Component: **OXYGEN**

Requested Concentration: 19.5 %
Certified Concentration: 19.26 %
Instrument Used: SIEMENS OXYMAT 5F
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 05/21/2014

Reference Standard Type: GMIS
Ref. Std. Cylinder #: SA6707
Ref. Std. Conc: 23.14 %
Ref. Std. traceable to SRM #: 2659A
SRM Sample #:
SRM Cylinder #:

First Analysis Data:						Date:	05/28/2014
Z:	0	R:	23.15	C:	19.25	Conc:	19.24
R:	23.15	Z:	0	C:	19.25	Conc:	19.24
Z:	0	C:	19.25	R:	23.15	Conc:	19.29
UOM:	%					Mean Test Assay:	19.26 %

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%					Mean Test Assay:	0 %

Analyzed by: Judith Imperial

Certified by: Jeff Gosner

Information contained herein has been prepared at your request by qualified experts within Praxair Distribution, Inc. While we believe that the information is accurate within the limits of the analytical methods employed and is complete to the extent of the specified analyses performed, we make no warranty or representation as to the suitability of the use of the information for any purpose. The information is offered with the understanding that any use of the information is at the sole discretion and risk of the user. In no event shall the liability of Praxair Distribution, Inc. arising out of the use of the information contained herein exceed the fee established for providing such information.

Making Our Planet More Productive

PRAXAIR

Praxair Distribution Mid-Atlantic
One Steel Road East,
Morrisville, PA 19067
Tel: (800) 638-6360 Fax:(215) 736 5240
PGVP ID: F32015

DocNumber: 000013804

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PDMA WAREHOUSE FAIRLESS HI
ONE STEEL RD E
MORRISVILLE PA 190670

Praxair Order Number: 72484158
Customer P. O. Number: 5649109
Customer Reference Number: WA904

Fill Date: 7/23/2015
Part Number: NI CD10O10E-AS
Lot Number: 301603204504
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	7/27/2023		NIST Traceable Analytical Uncertainty:
Cylinder Number:	CC313420		
9.67 %	CARBON DIOXIDE		± 0.7 %
10.10 %	OXYGEN		± 0.2 %
Balance	NITROGEN		

Certifcation Information: *Certification Date:* 7/27/2015 *Term:* 96 Months *Expiration Date:* 7/27/2023

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. **Component: CARBON DIOXIDE**

Requested Concentration: 10 %
Certified Concentration: 9.67 %
Instrument Used: SIEMENS ULTRAMAT 5E SN: D2-412
Analytical Method: NON-DISPERSIVE INFRARED
Last Multipoint Calibration: 7/25/2015

First Analysis Data:						Date:	7/27/2015
Z:	0	R:	9.98	C:	9.69	Conc:	9.69
R:	9.99	Z:	0	C:	9.67	Conc:	9.67
Z:	0	C:	9.67	R:	9.98	Conc:	9.67
UOM:	%			Mean Test Assay:			9.67 %

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC57641
Ref. Std. Conc: 9.98%
Ref. Std. Traceable to SRM # : 2745
SRM Sample # : 9-C-34
SRM Cylinder # : CAL016129

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

2. **Component: OXYGEN**

Requested Concentration: 10 %
Certified Concentration: 10.10%
Instrument Used: SIEMENS OXYMAT 5F
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 7/23/2015

First Analysis Data:						Date:	7/27/2015
Z:	0	R:	21.14	C:	10.1	Conc:	10.1
R:	21.16	Z:	0	C:	10.1	Conc:	10.1
Z:	0	C:	10.1	R:	21.14	Conc:	10.1
UOM:	%			Mean Test Assay:			10.1 %

Reference Standard Type: SRM
Ref. Std. Cylinder # : CC182161
Ref. Std. Conc: 21.14 %
Ref. Std. Traceable to SRM # : 2659A
SRM Sample # : 7-E-24
SRM Cylinder # : FF18300

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

Analyzed by: Megha Patel

Certified by: Judith Imperial

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Praxair Distribution Mid-Atlantic
One Steel Road East,
Morrisville, PA 19067
Tel: (800) 638-6360 Fax:(215) 736 5240
PGVP ID: F32014

DocNumber: 000008664

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PDI WHSE RALEIGH
2807 GRESHAM LAKE RD
RALEIGH NC 276160

Praxair Order Number: 04939769
Customer P. O. Number: --None-- 99
Customer Reference Number:

Fill Date: 5/28/2014
Part Number: EV NISD65ME-AS
Lot Number: 304622148403
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	6/9/2022	NIST Traceable
Cylinder Number:	CC232070	Analytical Uncertainty:
64.9 ppm	SULFUR DIOXIDE	± 0.3 %
Balance	NITROGEN	

Certifcation Information: *Certification Date:* 6/9/2014 *Term:* 96 Months *Expiration Date:* 6/9/2022

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. **Component: SULFUR DIOXIDE**

Requested Concentration: 65 ppm
Certified Concentration: 64.9 ppm
Instrument Used: SIEMENS ULTRAMAT 6 NI-B3-331
Analytical Method: NON-DISPERSIVE INFRARED
Last Multipoint Calibration: 5/28/2014

First Analysis Data:						**Date:**	6/2/2014
Z:	0	**R:**	55.6	**C:**	64.5	**Conc:**	64.35
R:	55.4	**Z:**	0	**C:**	65.3	**Conc:**	65.14
Z:	0	**C:**	65	**R:**	55.6	**Conc:**	64.81
UOM:	PPM			**Mean Test Assay:**			64.78 PPM

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC95916
Ref. Std. Conc: 55.4 PPM
Ref. Std. Traceable to SRM # : 1693a
SRM Sample # : 96-K-36
SRM Cylinder # : CAL015193

Second Analysis Data:						**Date:**	6/9/2014
Z:	0	**R:**	56.1	**C:**	65.3	**Conc:**	64.29
R:	56.3	**Z:**	0	**C:**	66.3	**Conc:**	65.28
Z:	0	**C:**	66.5	**R:**	56.4	**Conc:**	65.48
UOM:	PPM			**Mean Test Assay:**			65.02 PPM

Analyzed by: Judith Imperial

Certified by: Jeff Gosner

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PRAXAIR

Praxair Distribution Mid-Atlantic
One Steel Road East,
Morrisville, PA 19067
Tel:(800)638-6360 Fax:(215)736-5240
PGVP ID: F32014

DocNumber: 000008731

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PDI WHSE RALEIGH
2807 GRESHAM LAKE RD
RALEIGH NC 276160

Praxair Order Number: 04966470
Customer P. O. Number: --None-- 99
Customer Reference Number:

Fill Date: 6/6/2014
Part Number: EV NISD125ME-AS
Lot Number: 304622157404
Cylinder Style & Outlet: AS CGA 660
Cylinder Pressure & Volume: 2000 psig 140 cu. ft.

Certified Concentration:

Expiration Date:	**6/17/2022**		NIST Traceable
Cylinder Number:	**CC311000**		Analytical Uncertainty:
128.9	**ppm**	**SULFUR DIOXIDE**	± 0.4 %
Balance		**NITROGEN**	

Certifcation Information: *Certification Date:* 6/17/2014 *Term:* 96 Months *Expiration Date:* 6/17/2022

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: SULFUR DIOXIDE

Requested Concentration: 125 ppm
Certified Concentration: 128.9 ppm
Instrument Used: SIEMENS ULTRAMAT 6 NI-B3-331
Analytical Method: NON-DISPERSIVE INFRARED
Last Multipoint Calibration: 5/28/2014

Reference Standard Type: GMIS
Ref. Std. Cylinder # : CC352685
Ref. Std. Conc: 304.1 PPM
Ref. Std. Traceable to SRM # : 1661A
SRM Sample # :
SRM Cylinder # :

First Analysis Data:							**Date:** 6/10/2014
Z: 0	**R:** 304.8	**C:** 129.2	**Conc:** 128.76				
R: 305.4	**Z:** 0	**C:** 129.5	**Conc:** 129.06				
Z: 0	**C:** 129.3	**R:** 305.2	**Conc:** 128.86				
UOM: PPM			**Mean Test Assay:**	128.9 PPM			

Second Analysis Data:							**Date:** 6/17/2014
Z: 0	**R:** 304.2	**C:** 129.1	**Conc:** 128.87				
R: 304.9	**Z:** 0	**C:** 129.2	**Conc:** 128.97				
Z: 0	**C:** 129.1	**R:** 304.8	**Conc:** 128.87				
UOM: PPM			**Mean Test Assay:**	128.91 PPM			

Analyzed by: Judith Imperial

Certified by: Megha Patel

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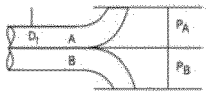
AECOM

S-TYPE PITOT TUBE INSPECTION

Pitot tube No: RP 8-4 (ink) **Date:** 12/23/2015 **Performed By:** RLB

Pitot tube assembly level? x Yes ____ No

Pitot tube openings damaged? ____ Yes (explain below) x No

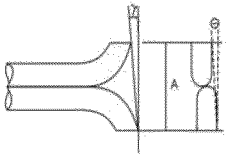


D_t ("): 3/8 (3/16"<D_t<3/8")

P_A ("): 0.429 P_A = 1.16 *Dt (1.05*D_t<$P_{A,B}$<1.5*D_t)

P_B ("): 0.413 P_B = 1.11 *Dt (1.05*D_t<$P_{A,B}$<1.5*D_t)

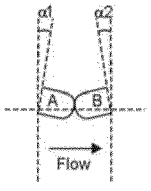
(P_A=P_B ± 0.063")



□: 1 °

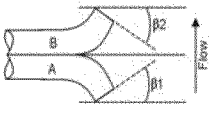
□ : 2 ° 0.888

A ("): 0.842



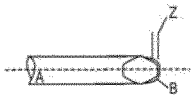
$□_1$: 1 ° (<10°)

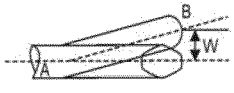
$□_2$: 1 ° (<10°)



$□_1$: 0 ° (<5°)

$□_2$: 0 ° (<5°)





z = (A tan □): 0.015 " (< 0.125) **w = (A tan □):** 0.029 " (< 0.03125)

Comments:

Calibration Required? ____ Yes x No

Pitot tube No. RP 8-4 (ink) meets Method 2 specifications and is assigned a calibration factor of 0.84.

Signature: Lance Burleson

5Point Console Dry Gas Meter Calibration

Console ID: N-55

Calibrated by	Initials	RLM
	Date	12/1/15
Reviewed by	Initials	DM
	Date	12/11/15

Expiration Date
30-Nov-2016

Orifice ID:	N-11		N-16		N-19		N-23		N-30	
Orifice K':	0.3084		0.4339		0.5054		0.6295		0.8148	
Dry Gas Meter	Run #1a	Run #1b	Run #2a	Run #2b	Run #3a	Run #3b	Run #4a	Run #4b	Run #5a	Run #5b
Initial Reading, (ft^3)	533.231	537.600	546.340	551.925	514.590	524.839	557.506	565.576	582.501	592.768
Final Reading, (ft^3)	537.600	541.974	551.925	557.506	524.839	533.231	565.576	582.397	592.768	604.048
Difference, (ft^3)	4.369	4.374	5.585	5.581	10.249	8.392	8.070	16.821	10.267	11.280
Initial Meter Temp., (°F)	68	68	68	69	67	67	69	69	64	65
Final Meter Temp., (°F)	68	68	69	69	67	68	69	69	65	66
Average Meter Temp., (°F)	68.0	73.0	68.5	69.0	67.0	67.5	69.0	69.0	64.5	65.5
Test Time (min.)	11	11	10	10	16	13	10	21	10	11
Orifice Manometer Reading, ("H_2O)	0.52	0.52	1.10	1.10	1.45	1.45	2.30	2.30	3.65	3.65
Barometric Pressure, ("Hg)	30.16	30.16	30.16	30.16	30.16	30.16	30.16	30.16	30.17	30.17
Ambient Temperature, (°F)	65	65	65	65	65	65	66	66	64	64
Pump Vacuum, ("Hg)	21	21	20	20	19	19	18	18	16	16
Standard Volume of the Meter, (V_{mstd})	4.408	4.371	5.637	5.628	10.383	8.494	8.162	17.012	10.510	11.525
Standard Volume of Critical Orifice, (V_{crstd})	4.465	4.465	5.711	5.711	10.644	8.648	8.278	17.384	10.739	11.813
Flow Rate (cfm)	0.401	0.397	0.564	0.563	0.649	0.653	0.816	0.810	1.051	1.048
DGM Calibration Factor, (Y)	1.013	1.021	1.013	1.015	1.025	1.018	1.014	1.022	1.022	1.025
Average DGM Calibration Factor (Y)	1.017		1.014		1.022		1.018		1.023	
Delta H@, ("H_2O)	1.776	1.760	1.920	1.919	1.874	1.873	1.921	1.921	1.839	1.836
Average $\Delta H@$, ("H_2O)	1.768		1.920		1.874		1.921		1.838	

Current Average Y	1.019
All Individual Y within 2% of mean?	TRUE
Average Delta $H_@$	1.864
All individual $\Delta H_@$ within 0.20 "H_2O of mean	TRUE

CDS-04S DGM 5 point against orifice
Per EM SOP-002
Revision Date: Oct 2015

		0.034286	
max Y	1.023		0.958536
Min Y	1.014		0.041464
Y - Hi Defl	0.004	1.155	
Y Lo Defl	0.004790702		
Max delta H @	1.921		
Min delta H @	1.768		
delta H@ hi deflection	0.057		
delta H@ low deflection	0.096		

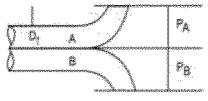
AECOM

S-TYPE PITOT TUBE INSPECTION

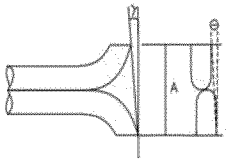
Pitot tube No: RP 8-4 (ink) **Date:** 10/20/2015 **Performed By** RLM

Pitot tube assembly level? x Yes ____ No

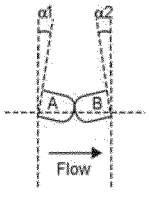
Pitot tube openings damaged? ____ Yes (explain below) x No



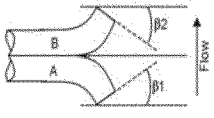
D_t ("):	3/8		(3/16"<D_t<3/8")
P_A ("):	0.45	P_A = 1.20	*Dt (1.05*D_t<$P_{A,B}$<1.5*D_t)
P_B ("):	0.45	P_B = 1.20	*Dt (1.05*D_t<$P_{A,B}$<1.5*D_t)
			(P_A=P_B ± 0.063")



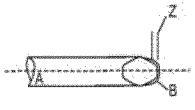
□:	1.1	°
□ :	0.1	°
A ("):	0.9	

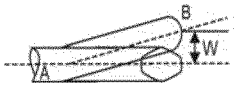


□$_1$:	0.2	° (<10°)
□$_2$:	0	° (<10°)



□$_1$:	1	° (<5°)
□$_2$:	2.3	° (<5°)





z = (A tan □): 0.017 " (< 0.125) **w = (A tan □):** 0.002 " (< 0.03125)

Comments:

Calibration Required? ____ Yes x No

Pitot tube No. RP 8-4 (ink) meets Method 2 specifications and is assigned a calibration factor of 0.84.

Signature: Lee Marchman

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00562

5 Point Console Dry Gas Meter Calibration

Console ID: N-54

Calibrated by	Initials	RLM
	Date	2/23/16
Reviewed by	Initials	
	Date	

Expiration Date
22-Feb-2017

Orifice ID:	N-11		N-16		N-19		N-23		N-30	
Orifice K':	0.3084		0.4339		0.5054		0.6295		0.8148	
Dry Gas Meter	Run #1a	Run #1b	Run #2a	Run #2b	Run #3a	Run #3b	Run #4a	Run #4b	Run #5a	Run #5b
Initial Reading, (ft^3)	927.826	936.182	1010.656	1019.978	52.284	60.432	1035.400	1043.829	943.909	973.061
Final Reading, (ft^3)	936.182	943.909	1019.978	1026.390	60.432	67.226	1043.829	1052.283	973.061	988.266
Difference, (ft^3)	8.356	7.727	9.322	6.412	8.148	6.794	8.429	8.454	29.152	15.205
Initial Meter Temp., (°F)	61	68	74	74	74	74	74	74	71	72
Final Meter Temp., (°F)	68	71	74	74	74	74	74	74	72	73
Average Meter Temp., (°F)	64.5	69.5	74.0	74.0	74.0	74.0	74.0	74.0	71.5	72.5
Test Time (min.)	23	16.5	16	11	12	10	10	10	27	14
Orifice Manometer Reading, ("H_2O)	0.51	0.51	1.10	1.10	1.40	1.40	2.20	2.20	3.70	3.70
Barometric Pressure, ("Hg)	30.59	30.59	30.59	30.59	30.59	30.59	30.59	30.59	30.59	30.59
Ambient Temperature, (°F)	70	70	67	67	67.5	67.5	67	67	67	67
Pump Vacuum, ("Hg)	22	22	20	20	19	19	18	18	17	17
Standard Volume of the Meter, (V_{mstd})	8.607	7.884	9.445	6.496	8.261	6.888	8.563	8.588	29.860	15.545
Standard Volume of Critical Orifice, (V_{crstd})	9.425	6.761	9.251	6.360	8.078	6.731	8.388	8.388	29.315	15.200
Flow Rate (cfm)	0.374	0.478	0.590	0.591	0.688	0.689	0.856	0.859	1.106	1.110
DGM Calibration Factor, (Y)	1.095	0.858	0.979	0.979	0.978	0.977	0.980	0.977	0.982	0.978
Average DGM Calibration Factor (Y)	0.976		0.979		0.977		0.978		0.980	
Delta H@, ("H_2O)	1.763	1.746	1.881	1.881	1.769	1.769	1.797	1.797	1.825	1.822
Average ΔH@, ("H_2O)	1.754		1.881		1.769		1.797		1.823	

Current Average Y	0.9782
All Individual Y within 2% of mean?	TRUE
Average Delta $H_@$	1.805
All individual Δ $H_@$ within 0.20 "H_2O of mean	TRUE

CDS-04S DGM 5 point against orifice
Per EM SOP-002
Revision Date: March 2013

Three-Point Dry Gas Meter Calibration for Low-Flow Applications Using Critical Orifices

Console ID: M30B # 1

Thermometer ID: RTP #1

DGM Calibration

Calibrated By	Initials	RLM	Reviewed By	Initials	
	Date	2/5/2015		Date	

			Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Orifice Information	ID Number		2690-2 Side A			2690-2 Side		
	K Factor		0.7928			B		
	Nominal Flow Rate (l/min)		1.02			1.02		
DGM being Calibrated	Volume (l)	Initial	0	0	0	0	0	0
		Final	20.1	94.706	16.409	21.446	18.428	14.322
	T_{meter} (°F)	Initial	66	67	71	72	72	73
		Final	67	71	71	72	73	73
	Meter Pressure (H_2O)							
Test Conditions	Pump Vacuum ("Hg)		19	19	19	17	17	17
	P_{bar} ("Hg)		30.2			30.2		
	$T_{ambient}$ (°F)		68			68		
	Test Duration (minutes)		20	93	16	21	18.5	14
Calculated Values	Meter Volume (DGM) (l)		20.1	94.706	16.409	21.446	18.428	14.322
	Average DGM Temp (°F)		66.50	69.00	71.00	72.00	72.50	73.00
	Std Volume (DGM) (dsL)		20.34	95.37	16.46	21.48	18.44	14.31
	Std Volume (orifice) (dsL)		20.84	96.90	16.67	21.88	19.28	14.59
	Flow rate (l/min)		1.005	1.018	1.026	1.021	0.996	1.023
	DGMCF, Y		1.025	1.016	1.013	1.019	1.046	1.019
	Average DGMCF, Y_d		1.018			1.028		
			Acceptable			Acceptable		

Acceptance Criteria:

1: Each individual Y value must be within ?? of the average Y value

2: Average Y value must be between xx and yy.

	Side A	Side B
Pretest Y values	1.00	1.00
Post Test Y Values	1.018	1.028

hree-Point Dry Gas Meter Calibration for Low-Flow Applications Using Critical Orific

Console ID: M30B # 2

Thermometer ID: RTP #1

DGM Calibration

Calibrated By	Initials	RLM	Reviewed By	Initials	
	Date	2/5/2015		Date	

			Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
Orifice Information	ID Number		2690-3 Side A			2690-3 Side B		
	K Factor		1.1601			1.1601		
	Nominal Flow Rate (l/min)		1.49			1.49		
DGM being Calibrated	Volume (l)	Initial	0	0	0	0	0	0
		Final	32.599	130.984	22.436	32.915	27.755	19.479
	T_{meter} (°F)	Initial	66	67	70	71	72	71
		Final	67	70	71	72	73	72
	Meter Pressure (H_2O)							
Test Conditions	Pump Vacuum ("Hg)		17	17	17	12	12	12
	P_{bar} ("Hg)		30.2			30.2		
	$T_{ambient}$ (°F)		62			62		
	Test Duration (minutes)		22	88	15	22	18.5	13
Calculated Values	Meter Volume (DGM) (l)		32.599	130.984	22.436	32.915	27.755	19.479
	Average DGM Temp (°F)		66.50	68.50	70.50	71.50	72.50	71.50
	Std Volume (DGM) (dsL)		32.98	132.03	22.53	32.99	27.77	19.52
	Std Volume (orifice) (dsL)		33.74	134.94	23.00	33.74	28.37	19.93
	Flow rate (l/min)		1.482	1.488	1.496	1.496	1.500	1.498
	DGMCF, Y		1.023	1.022	1.021	1.023	1.022	1.021
	Average DGMCF, Y_d		1.022			1.022		
			Acceptable			Acceptable		

Acceptance Criteria:

1: Each individual Y value must be within ?? of the average Y value

2: Average Y value must be between xx and yy.

	Side A	Side B
Pretest Y values	1.00	1.00
Post Test Y Values	1.022	1.022
% difference	-2%	-2%

APPENDIX D
EXAMPLE CALCULATIONS

Example Calculations for Particulates

Run 1 Calciner No. 3 6/9/2015

Gas Volume Collected, DCF

VM = (Final DGM - Initial DGM)

VM = (906.659-864.800) = 41.859 DCF

Corrected Gas Volume, DCF

Corrected VM = (y x VM)

Corrected VM = (1.032*41.859) = 43.198 DCF

Gas Volume, DSCF

Vmstd = (Corrected VM x 528 x ((Avg Delta H/13.6) + Pbar)) / ((Avg Tm oF + 460) x 29.92)

Vmstd = (43.198*528*((1.00/13.6)+29.80))/((101+460)*29.92) =40.612 DSCF

Sample Gas Volume

Total Vmstd = Vmstd + ((Vwcg + Vwsg) x 0.04715)

Total Vmstd = 40.612+(424.54+11.87)*0.04715 = 61.189 SCF

% Moisture by Collection

% H2O = ((Total Vmstd - Vmstd) / Total Vmstd) x 100

% H2O = ((61.189-40.612)/61.189)*100 = 33.63%

Vapor Pressure

V.P. = S.V.P. - (0.000376 x Ps x (Td - Tw) x (1 + ((Tw - 32) / 1571))

V.P. = 8.981-(0.000376*29.78*(157-157)*(1+(157-32)/1571)) =8.981 "Hg

% Moisture by Vapor Pressure

% H2O = (V.P. / Ps) *100

% H2O = (8.981/29.78)*100 = 30.16%

Wet Molecular Wt of Stack Gas, lb/lb mole

Ms = ((1 - (% H2O / 100)) x Md) + (18 x (% H2O / 100))

Ms = ((1-(30.16/100))*29.000)+(18*(30.16/100)) = 25.68 lb/lb mole

Stack Velocity, Ft/Sec

vs = 85.49 x Cp x Avg SQRT Delta P x (Ts oR / (Ps x Ms))^0.5

vs = 85.49*0.84*0.5137*(617/(29.78*25.68))^0.5 = 33.14 ft/sec

Stack Flow Rate, ACFM

Qaw = As x vs x 60

Qaw = 28.27*33.14*60 = 56220 ACFM

Stack Flow Rate, SCFM

Qsw = Qaw x (528 / Ts oR) x (Ps / 29.92)

Qsw = 56220*(528/617)*(29.78/29.92) = 47859 SCFM

Stack Flow Rate, DSCFM

QsD = (1 - (% H2O)) x Qsw

QsD = (1-(30.16/100))*47859 = 33427 DSCFM

Isokinetic Sampling Rate

Isokinetic Sampling Rate = (Ts oR x Vmstd x 29.92 x 100) / (528 x vs x Ps x Sampling Time x 60 x An x (1 - Bws))

Isokinetic Sampling Rate=(617*40.612*29.92*100)/(528*33.14*29.78*72*60*0.00046*(1-30.16%)) = 104%

Total PM Emission Rate Lbs./Hr

Total PM Emission Rate, Lbs./Hr = ((Mg Particulate/DSCF + CPM mg/DSCF) x DSCFM x 60 / 1000 / 453.59)
Total PM Emission Rate, Lbs./Hr = ((0.2758+0.3122)*33427*60/1000/453.59) = 2.60 Lbs./Hr

Filterable PM Emission Rate Lbs./Hr

Filterable PM Emission Rate, Lbs./Hr = (Mg Particulate/DSCF x DSCFM x 60 / 1000 / 453.59)
Filterable PM Emission Rate, Lbs./Hr = (0.2758*33427*60/1000/453.59) = 1.22 Lbs./Hr

Condensable PM Emission Rate Lbs./Hr

Condensable PM Emission Rate, Lbs./Hr = (CPM Mg/DSCF x DSCFM x 60 / 1000 / 453.59)
Condensable PM Emission Rate, Lbs./Hr = (0.3122*33427*60/1000/453.59) = 1.38 Lbs./Hr

CPM mg / DSCF

CPM mg / DSCF = (Mass of Organic Fraction + Mass of Inorganic Fraction) / Gas Volume STP
CPM mg / DSCF = (0.0047+0.0079)*1000/43.198 = 0.3122 mg/DSCF

Average Daily PM Emission Rate Lbs./Hr.

Eavg= EsS (A+B)/AR) +EN (((R-S)/R)-(BS/AR))
Eavg=((6.833*0.4028)*((0.4028+0.7972)/(0.4028*24))+2.90*(((24-0.4028)/24)-((0.7972*0.4028)/(0.4028*24))))=3.101Lbs./Hr

PM Emission Rate, grains/dscf

PM grains/dscf= ((((Eavg/60)*453590))/QsD)*0.015432)
PM grains/dscf= (0.3507*7000)/453952 = 0.005

Example Calculations Continued

A= Hours of washing during test
ACFM = Actual Cubic Feet per Minute
An = Area of Nozzle, Ft2
As = Area of Stack, Ft2
B= Hours not washing during wash test
Cp = Pitot Correction Factor
CPM = Concentration of Particulate Matter corrected to Standard Conditons
DCF = Dry Ft3
Delta H = Average Pressure Differential Across the Orifice Meter, in. H20
DGM = Dry Gas Meter
DGV = Dry Gas Volume
DSCF = Dry Standard Ft3
DSCFM = Dry Standard Ft3/Min
Eavg = Average daily emission rate in Lbs/hr
E_N= Average emissions lb/hr of tests without wash cycle
E_S =Emission Rate lb/hr for wash cycle test
GVC = Gas Volume Collected
Md = Dry Molecular Weight of Stack Gas-29.0 Assumed-Approved by DAQ
Ms = Wet Molecular Weight of Stack Gas
Nomenclature
Pbar = Barometric Pressure, in. Hg
Ps = Gas Pressure, in. Hg
Qaw = Actual Wet Stack Gas Flow Rate, ACFM
Qsd = Standard Dry Stack Gas Flow Rate, DSCFM
Qsw = Standard Wet Stack Gas Flow Rate, SCFM
R= Hours of operation per 24 hour period
S.V.P. = Saturated Vapor Pressure
S= Hours or washing per day
SCF = Standard Ft3
SCFM = Standard Ft3/Min
Td = Stack Temperature Dry Bulb oF
Tm = Meter Temperature, F
Total Vmstd = Sample Gas Volume, SCF
Ts = Stack Gas Temperature, F
Tw = Stack Temperature Wet Bult oF
Vm = Gas Volume Collected
Vmstd = Gas Volume at Standard Conditions, DSCF
Vmstd = Gas Volume Collected Corrected to Standard Conditions
VP = Vapor Pressure
vs = Stack Gas Velocity, ft/sec
Vwc = Volume of Water Collected (impingers), gm
Vwsg = Water Collected in Silica Gel, gm
y = Dry Gas Meter Correction Factor

Example Calculations for Particulates

Run 1 Calciner No. 3 6/9/2015

Gas Volume Collected, DCF

VM = (Final DGM - Initial DGM)

VM = (906.659-864.800) = 41.859 DCF

41.859

Corrected Gas Volume, DCF

Corrected VM = (y x VM)

Corrected VM = (1.032*41.859) = 43.198 DCF

43.19849

Gas Volume, DSCF

Vmstd = (Corrected VM x 528 x ((Avg Delta H/13.6) + Pbar)) / ((Avg Tm oF + 460) x 29.92)

Vmstd = (43.198*528*((1.00/13.6)+29.80))/((101+460)*29.92) =40.612 DSCF

40.59379

Sample Gas Volume

Total Vmstd = Vmstd + ((Vwcg + Vwsg) x 0.04715)

Total Vmstd = 40.612+(424.54+11.87)*0.04715 = 61.189 SCF

61.18873

% Moisture by Collection

% H2O = ((Total Vmstd - Vmstd) / Total Vmstd) x 100

% H2O = ((61.189-40.612)/61.189)*100 = 33.63%

33.62859

Vapor Pressure

V.P. = S.V.P. - (0.000376 x Ps x (Td - Tw) x (1 + ((Tw - 32) / 1571))

V.P. = 8.981-(0.000376*29.78*(157-157)*(1+(157-32)/1571)) =8.981 "Hg

8.981

% Moisture by Vapor Pressure

% H2O = (V.P. / Ps) *100

% H2O = (8.981/29.78)*100 = 30.16%

30.15782

Wet Molecular Wt of Stack Gas, lb/lb mole

Ms = ((1 - (% H2O / 100)) x Md) + (18 x (% H2O / 100))

Ms = ((1-(30.16/100))*29.000)+(18*(30.16/100)) = 25.68 lb/lb mole

25.6824

Stack Velocity, Ft/Sec

vs = 85.49 x Cp x Avg SQRT Delta P x (Ts oR / (Ps x Ms))^0.5

vs = 85.49*0.84*0.5137*(617/(29.78*25.68))^0.5 = 33.14 ft/sec

33.13499

Stack Flow Rate, ACFM

Qaw = As x vs x 60

Qaw = 28.27*33.14*60 = 56220 ACFM

56212.07

Stack Flow Rate, SCFM

Qsw = Qaw x (528 / Ts oR) x (Ps / 29.92)

Qsw = 56220*(528/617)*(29.78/29.92) = 47859 SCFM

47885.35

Stack Flow Rate, DSCFM

QsD = (1 - (% H2O)) x Qsw

QsD = (1-(30.16/100))*47859 = 33427 DSCFM

33424.73

Isokinetic Sampling Rate

Isokinetic Sampling Rate = (Ts oR x Vmstd x 29.92 x 100) / (528 x vs x Ps x Sampling Time x 60 x An x (1 - Bws))=98.27

Isokinetic Sampling Rate=(617*40.612*29.92*100)/(528*33.14*29.78*72*60*0.00046*(1-30.16%)) = 104%

103.66788

Total PM Emission Rate Lbs./Hr

Total PM Emission Rate, Lbs./Hr = ((Mg Particulate/DSCF + CPM mg/DSCF) x DSCFM x 60 / 1000 / 453.59)

Total PM Emission Rate, Lbs./Hr = ((0.2758+0.3122)*33427*60/1000/453.59) = 2.60 Lbs./Hr

2.599935

Filterable PM Emission Rate Lbs./Hr

Filterable PM Emission Rate, Lbs./Hr = (Mg Particulate/DSCF x DSCFM x 60 / 1000 / 453.59)

Filterable PM Emission Rate, Lbs./Hr = (0.3122*33427*60/1000/453.59) = 1.38 Lbs./Hr

1.380442

Condensable PM Emission Rate Lbs./Hr

Condensable PM Emission Rate, Lbs./Hr = (CPM Mg/DSCF x DSCFM x 60 / 1000 / 453.59)

Condensable PM Emission Rate, Lbs./Hr = (0.3122*33427*60/1000/453.59) = 1.38 Lbs./Hr

1.380442

CPM mg / DSCF

CPM mg / DSCF = (Mass of Organic Fraction + Mass of Inorganic Fraction) / Gas Volume STP

CPM mg / DSCF = (0.0047+0.0079)*1000/43.198 = 0.3122 mg/DSCF

0.29168

Average Daily PM Emission Rate Lbs./Hr.

Eavg= EsS (A+B)/AR) +EN (((R-S)/R)-(BS/AR))

Eavg=((6.833*0.4028)*((0.4028+0.7972)/(0.4028*24))+2.90*(((24-0.4028)/24)-((0.7972*0.4028)/(0.4028*24))))=3.101Lbs./Hr

3.09665

PM Emission Rate, grains/dscf

PM grains/dscf= ((((Eavg/60)*453590))/QsD)*0.015432)

PM grains/dscf= (0.3507*7000)/453952 = 0.005

0.005408

Example Calculations Continued

A= Hours of washing during test
ACFM = Actual Cubic Feet per Minute
An = Area of Nozzle, Ft2
As = Area of Stack, Ft2
B= Hours not washing during wash test
Cp = Pitot Correction Factor
CPM = Concentration of Particulate Matter corrected to Standard Conditons
DCF = Dry Ft3
Delta H = Average Pressure Differential Across the Orifice Meter, in. H20
DGM = Dry Gas Meter
DGV = Dry Gas Volume
DSCF = Dry Standard Ft3
DSCFM = Dry Standard Ft3/Min
Eavg = Average daily emission rate in Lbs/hr
E_N= Average emissions lb/hr of tests without wash cycle
Es =Emission Rate lb/hr for wash cycle test
GVC = Gas Volume Collected
Md = Dry Molecular Weight of Stack Gas-29.0 Assumed-Approved by DAQ
Ms = Wet Molecular Weight of Stack Gas
Nomenclature
Pbar = Barometric Pressure, in. Hg
Ps = Gas Pressure, in. Hg
Qaw = Actual Wet Stack Gas Flow Rate, ACFM
Qsd = Standard Dry Stack Gas Flow Rate, DSCFM
Qsw = Standard Wet Stack Gas Flow Rate, SCFM
R= Hours of operation per 24 hour period
S.V.P. = Saturated Vapor Pressure
S= Hours or washing per day
SCF = Standard Ft3
SCFM = Standard Ft3/Min
Td = Stack Temperature Dry Bulb oF
Tm = Meter Temperature, F
Total Vmstd = Sample Gas Volume, SCF
Ts = Stack Gas Temperature, F
Tw = Stack Temperature Wet Bult oF
Vm = Gas Volume Collected
Vmstd = Gas Volume at Standard Conditions, DSCF
Vmstd = Gas Volume Collected Corrected to Standard Conditions
VP = Vapor Pressure
vs = Stack Gas Velocity, ft/sec
Vwc = Volume of Water Collected (impingers), gm
Vwsg = Water Collected in Silica Gel, gm
y = Dry Gas Meter Correction Factor

Example Calculations for Particulates

Run 1 Calciner No. 3 6/9/2015

Gas Volume Collected, DCF

VM = (Final DGM - Initial DGM)

VM = (460.144-416.000) = 44.144 DCF

44.144

Corrected Gas Volume, DCF

Corrected VM = (y x VM)

Corrected VM = (0.976*44.144) = 43.085 DCF

43.08454

Gas Volume, DSCF

Vmstd = (Corrected VM x 528 x ((Avg Delta H/13.6) + Pbar)) / ((Avg Tm oF + 460) x 29.92)

Vmstd = (43.085*528*((1.17/13.6)+30.13))/((75+460)*29.92) = 42.931 DSCF

42.94198

Sample Gas Volume

Total Vmstd = Vmstd + ((Vwcg + Vwsg) x 0.04715)

Total Vmstd = 42.931+(286.61+11.24)*0.04715 = 56.975 SCF

56.97463

% Moisture by Collection

% H2O = ((Total Vmstd - Vmstd) / Total Vmstd) x 100

% H2O = ((56.975-42.931)/56.975)*100 = 24.65%

24.64941

Vapor Pressure

V.P. = S.V.P. - (0.000376 x Ps x (Td - Tw) x (1 + ((Tw - 32) / 1571))

V.P. = 7.202-(0.000376*30.11*(148-148)*(1+(148-32)/1571)) = 7.202 "Hg

7.202

% Moisture by Vapor Pressure

% H2O = (V.P. / Ps) *100

% H2O = (7.202/30.11)*100 = 23.92%

23.91896

Wet Molecular Wt of Stack Gas, lb/lb mole

Ms = ((1 - (% H2O / 100)) x Md) + (18 x (% H2O / 100))

Ms = ((1-(23.92/100))*29.000)+(18*(23.92/100)) = 26.37 lb/lb mole

26.3688

Stack Velocity, Ft/Sec

vs = 85.49 x Cp x Avg SQRT Delta P x (Ts oR / (Ps x Ms))^0.5

vs = 85.49*0.84*0.5309*(612/(30.11*26.37))^0.5 = 33.37 ft/sec

33.4713

Stack Flow Rate, ACFM

Qaw = As x vs x 60

Qaw = 28.27*33.37*60 = 56615 ACFM

56602.19

Stack Flow Rate, SCFM

Qsw = Qaw x (528 / Ts oR) x (Ps / 29.92)

Qsw = 56615*(528/608)*(30.11/29.92) = 49450 SCFM

49477.87

Stack Flow Rate, DSCFM

QsD = (1 - (% H2O)) x Qsw

QsD = (1-(23.92/100))*49450 = 37620 DSCFM

37621.56

Isokinetic Sampling Rate

Isokinetic Sampling Rate = (Ts oR x Vmstd x 29.92 x 100) / (528 x vs x Ps x Sampling Time x 60 x An x (1 - Bws))=98.27

Isokinetic Sampling Rate=(608*42.931*29.92*100)/(528*33.37*30.11*72*60*0.00044*(1-23.92%)) = 102%

101.79545

Total PM Emission Rate Lbs./Hr

Total PM Emission Rate, Lbs./Hr = ((Mg Particulate/DSCF + CPM mg/DSCF) x DSCFM x 60 / 1000 / 453.59)

Total PM Emission Rate, Lbs./Hr = ((0.1561+0.1025)*37620*60/1000/453.59) = 1.29 Lbs./Hr

1.286871

Filterable PM Emission Rate Lbs./Hr

Filterable PM Emission Rate, Lbs./Hr = (Mg Particulate/DSCF x DSCFM x 60 / 1000 / 453.59)

Filterable PM Emission Rate, Lbs./Hr = (0.1561*37620*60/1000/453.59) = 0.78 Lbs./Hr

0.7768

Condensable PM Emission Rate Lbs./Hr

Condensable PM Emission Rate, Lbs./Hr = (CPM Mg/DSCF x DSCFM x 60 / 1000 / 453.59)

Condensable PM Emission Rate, Lbs./Hr = (0.1025*37620*60/1000/453.59) = 0.51 Lbs./Hr

0.510071

CPM mg / DSCF

CPM mg / DSCF = (Mass of Organic Fraction + Mass of Inorganic Fraction) / Gas Volume STP

CPM mg / DSCF = (0.0028+0.0016)*1000/42.931 = 0.1025 mg/DSCF

0.10249

Average Daily PM Emission Rate Lbs./Hr.

Eavg= EsS (A+B)/AR) +EN (((R-S)/R)-(BS/AR))

Eavg=((11.050*0.6500)*((0.6500+0.0833)/(0.6500*24))+1.39*(((24-0.6500)/24)-((0.0833*0.6500)/(0.6500*24))))=1.69Lbs./Hr

1.685153

PM Emission Rate, grains/dscf

PM grains/dscf= ((((Eavg/60)*453590))/QsD)*0.015432)

PM grains/dscf= (0.6989*7000)/453952 = 0.01

0.010777

Example Calculations Continued

A= Hours of washing during test
ACFM = Actual Cubic Feet per Minute
An = Area of Nozzle, Ft2
As = Area of Stack, Ft2
B= Hours not washing during wash test
Cp = Pitot Correction Factor
CPM = Concentration of Particulate Matter corrected to Standard Conditons
DCF = Dry Ft3
Delta H = Average Pressure Differential Across the Orifice Meter, in. H20
DGM = Dry Gas Meter
DGV = Dry Gas Volume
DSCF = Dry Standard Ft3
DSCFM = Dry Standard Ft3/Min
Eavg = Average daily emission rate in Lbs/hr
E_N= Average emissions lb/hr of tests without wash cycle
Es =Emission Rate lb/hr for wash cycle test
GVC = Gas Volume Collected
Md = Dry Molecular Weight of Stack Gas-29.0 Assumed-Approved by DAQ
Ms = Wet Molecular Weight of Stack Gas
Nomenclature
Pbar = Barometric Pressure, in. Hg
Ps = Gas Pressure, in. Hg
Qaw = Actual Wet Stack Gas Flow Rate, ACFM
Qsd = Standard Dry Stack Gas Flow Rate, DSCFM
Qsw = Standard Wet Stack Gas Flow Rate, SCFM
R= Hours of operation per 24 hour period
S.V.P. = Saturated Vapor Pressure
S= Hours or washing per day
SCF = Standard Ft3
SCFM = Standard Ft3/Min
Td = Stack Temperature Dry Bulb oF
Tm = Meter Temperature, F
Total Vmstd = Sample Gas Volume, SCF
Ts = Stack Gas Temperature, F
Tw = Stack Temperature Wet Bult oF
Vm = Gas Volume Collected
Vmstd = Gas Volume at Standard Conditions, DSCF
Vmstd = Gas Volume Collected Corrected to Standard Conditions
VP = Vapor Pressure
vs = Stack Gas Velocity, ft/sec
Vwc = Volume of Water Collected (impingers), gm
Vwsg = Water Collected in Silica Gel, gm
y = Dry Gas Meter Correction Factor

Example Calculations, Based on Run #1

Barometric Pressure at the Sampling Location, Corrected (EPA Method 2, Section 6.5)

$$P_{bar} = P_{bar,meas} - (Elev \times 0.1/100)$$

$P_{bar,meas}$ = Barometric pressure as measured	=	30.09	in. Hg
Elev = elevation of sampling location relative to barometer	=	100	feet
P_{bar} = Barometric pressure at the sampling site	=	29.99	in. Hg

$$P_{bar} = 30.09 - \left(\frac{100 \times 0.1}{100}\right)$$

$$P_{bar} = 29.99$$

Absolute Stack Pressure (EPA Method 2, Section 6.5)

P_{bar} = Barometric pressure at the sampling site	=	29.99	in. Hg
P_g = Stack Static Pressure	=	-0.24	in. Hg
P_s = Absolute Stack Pressure	=	29.97	in. Hg

$$P_s = 29.99 + \left(\frac{-0.24}{13.6}\right)$$

$$P_s = 29.97$$

Volume of Water Vapor Condensed, corrected to standard conditions, ft^3 (US EPA Method 4, Sect. 12.1.2 and 12.1.3)

$$V_{w(std)} = K_3 \times (W_f - W_i)$$

K_3 = Conversion Constant	=	0.04715	
$(W_f - W_i)$ = Total weight of liquid collected	=	337.3	ft^3/g

$$V_{w(std)} = 0.04715 \times 337.3$$

$$V_{w(std)} = 15.90 \ ft^3$$

Moisture Content, proportion, by volume (US EPA Method 5, Eq. 5-3)

$$B_{ws} = \frac{V_{w(std)}}{V_{m(std)} + V_{w(std)}}$$

$V_{w(std)}$ = Volume of water vapor condensed	=	15.904	ft^3
$V_{m(std)}$ = Dry Gas Volume	=	43.216	ft^3

$$B_{ws} = \frac{15.904}{43.216 + 15.904}$$

$$B_{ws} = 0.2690$$

Moisture content at saturation:

From ASME 1967 Steam Tables (Lookup Table)

B_{ws} (sat) = 23.442

0.23441603

For further calculations:

B_{ws} = 0.234

Dry Molecular Weight of Stack Gas, lb/lb-mole (US EPA Method 3, Eq. 3-1)

$$M_d = MW_{CO2}(\%CO_2) + MW_{O2}(\%O_2) + MW_{N2}(\%N_2)$$

MW_{CO2}= Molecular weight of CO_2, divided by 100	=	0.44	lb/lb-mole
$\%CO_2$ = Percent CO_2 by volume, dry basis	=	7.9	%
MW_{O2} = Molecular weight of O_2, divided by 100	=	0.32	lb/lb-mole
$\%O_2$ = Percent O_2 by volume, dry basis	=	13.5	%
MW_{N2} = Molecular weight of N2, divided by 100	=	0.28	lb/lb-mole
$\%N_2$ = 100% - %CO - $\%CO_2$ - $\%O_2$ - %H2 - %CH4	=	78.6	%

$$M_d = (0.44 \times 7.9) + (0.32 \times 13.5) + (0.28 \times 78.6)$$

$$M_d = 29.80 \ lb/lb\text{-}mole$$

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Molecular Weight of stack gas, ib/lb-mole (US EPA Method 2, Eq. 2-6)

$M_s = M_d (1-B_{ws})+18.0(B_{ws})$

M_d= Dry molecular weight of stack gas	=	29.80	lb/lb-mole
B_{ws}= Proportion of water vapor, by volume	=	0.2344	proportion
18.0 = Molecular Weight of H_2O	=	18.00	lb/lb-mole

M_s = 29.80 x (1 - 0.234) + (18.00 x 0.234)

M_s = 27.04

Dry Gas Volume, corrected to standard conditions, ft^3 (US EPA Method 5, Eq. 5-1)

$$V_{m(std)} = V_m \times Y \times \frac{T_{std} \times (P_{bar} + (deltaH / 13.6))}{T_m \times P_{std}}$$

V_m = Volume of gas sample, dry	=	41.374	ft^3
Y = Dry gas meter calibration factor	=	0.9943	
Tstd = Standard Temperature	=	528.0	deg R
P_{bar} = Barometric pressure at the sampling site	=	29.99	in. Hg
DH = Average pressure differential across the orifice meter	=	1.12	in. H_2O
13.6 = Conversion factor		13.6	in. H_2O/in. Hg
Tm = Absolute average DGM temperature		505.2	deg R

$$V_{m(std)} = \frac{41.374 \times 0.9943 \times 528.0 \times (29.99 + (1.12 / 13.6))}{505.2 \times 29.92}$$

$V_{m(std)}$ = 43.216

Average Stack Gas Velocity, ft/sec (US EPA Method 2, Eq. 2-7)

$v_s = K_p \times C_p \times SqrtDP_{avg} \times sqrt(T_s/(P_s \times M_s))$

K_p= Velocity equation constant	=	85.49	ft/sec[((lb/lb-mole)(in.Hg))/((degR)(in.H2O))] $^{1/2}$
C_p = S type pitot tube coefficient	=	0.84	
$SqrtDP_{avg}$=ave. sqrt. of the velocity head of stack gas	=	0.57	in.H_2O
T_s = Absolute stack temperature	=	607.29	deg R
P_s = Absolute stack pressure	=	29.97	in. Hg
M_s = Molecular Weight of stack gas	=	27.04	lb/lb-mole

$$v_s = 85.49 \times 0.84 \times 0.57 \times \left(\frac{607.3}{29.97 \times 27.04}\right)^{0.5}$$

v_s = 35.42 ft/sec

v_s = 2,125 ft/min

Average Stack Gas Volumetric Flow Rate, Actual Conditions

$Q_{actual} = v_s \times A$

v_s = Average stack gas velocity	=	35.42	ft/sec
A = Cross sectional area of stack	=	28.27	ft^2

Q_{actual} = 35.42 x 28.27

Q_{actual} = 1001 cubic feet per second

Q_{actual} = 60,089 cubic feet per minute

Q_{actual} = 3,605,335 cubic feet per hour

Average Stack Gas Dry Volumetric Flow Rate, dscf/hr (US EPA Method 2, Eq. 2-8)

$$Q = \frac{3600 \times (1-B_{ws}) \times v_s \times A \times T_{std} \times P_s}{T_s \times P_{std}}$$

3600= Conversion factor	=	3600	sec/hr
B_{ws} = Proportion of water vapor, by volume	=	0.234	proportion
v_s= Average stack gas velocity	=	35.42	ft/sec
A = Cross sectional area of stack	=	28.27	ft^2
T_{std} = Standard absolute temperature	=	528	degR
P_s = Absolute stack pressure	=	29.97	in. Hg
T_s = Absolute stack temperature	=	607.3	degR
P_{std} = Standard absolute pressure	=	29.92	in. Hg

$$Q_s = \frac{3600 \times (1.00 - 0.234) \times 35.42 \times 28.274 \times 528 \times 29.97}{607.3 \times 29.92}$$

Q_s = 2,403,999 dscf/hr

= 40,067 dscf/min

Average Stack Gas Wet Basis Volumetric Flow Rate (scf/hr)

$$Q_w = \frac{Q}{(1\text{-}Bws)}$$

Q = Average Stack Gas Dry Volumetric Flow Rate	=	2,403,999	dscf/hr
B_{ws} = Proportion of water vapor, by volume	=	0.234	proportion

$$Q_w = \frac{2{,}403{,}999}{(1.00 - 0.234)}$$

Q_w = 3,140,086 wscf/hr

= 52,335 wscf/min

Isokinetic Variation, % (US EPA Method 5, Eq. 5-8)

$$I = \frac{100 \times T_s \times V_{m(std)} \times P_{std}}{60 \times T_{std} \times P_s \times v_s \times A_n \times min \times (1 - B_{ws})}$$

100 = Conversion to Percent	=	100	
T_s = Absolute stack temperature	=	607.3	degR
$V_{m(std)}$ = Dry Gas Volume	=	43.216	ft^3
P_{std} = Standard absolute pressure	=	29.92	in. Hg
60 = Sec/Min	=	60	Sec/Min
T_{std} = Standard absolute temperature	=	528.00	degR
P_s = Absolute stack pressure	=	29.97	in. Hg
v_s = Average stack gas velocity	=	35.42	ft/sec
A_n = Cross-sectional Area of nozzle	=	0.000417	ft^2
min = Total sampling time	=	72	minutes
B_{ws} = Proportion of water vapor, by volume	=	0.234	proportion

$$I = \frac{100 \times 607.3 \times 43.216 \times 29.92}{60.00 \times 528.00 \times 29.97 \times 35.42 \times 0.000417 \times 72 \times (1 - 0.234)}$$

I = 101.46

Post-Test Calibration Check (US EPA Guideline Document EMTIC GD-26)

$$Y_{qa} = \min / Vm \times \frac{0.0319 \times T_m}{DH_@ \times (P_{bar} + DH/13.6)} \times \frac{29}{M_d} \times (DH)^{1/2}_{avg}$$

min = Total sampling time	=	72	minutes
$V_{m(actual)}$ = Dry gas volume, actual conditions	=	41.374	ft^3
Tm = Absolute average DGM temperature	=	505.2	degR
$DH_@$ = Meter orifice pressure at 0.75 ft^3/min sampling rate	=	1.80	in. H_2O
P_{bar} = Barometric pressure at the sampling site	=	29.99	in. Hg
DH = Average pressure differential across the orifice meter	=	1.12	in. H_2O
$(DH)^{1/2}_{avg}$ = Average of square root values of DH	=	1.053	
M_d= Dry molecular weight of stack gas	=	29.80	lb/lb-mole

$$Y_{qa} = \min / Vm \times \frac{0.0319 \times 505.167}{1.80 \times (29.99 + 1.12/13.6)} \times \frac{29}{29.80} \times 1.053$$

Y_{qa} = 0.987

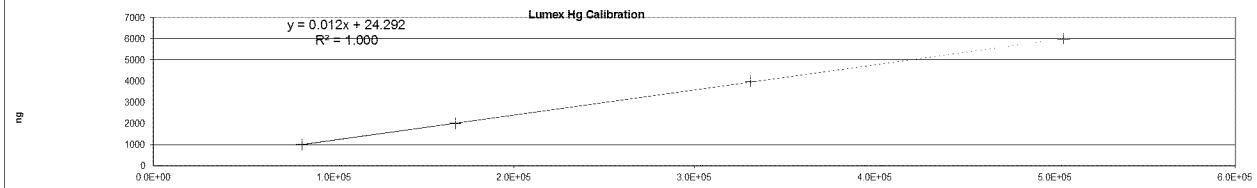
17cv1906 Sierra Club v. EPA - 6/22 Production

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APPENDIX E
ANALYTICAL LABORATORY DATA

AECOM		Slope:	1.19E-02	MDL (ng)	9.97	Temp. Profile #	3	Response Factor		Spike	2000	min	max
QC Summary		Intercept:	-1.47	DCS (ng)	12.19	Air Flow (l/min)	4	0.01186				1000	3000
		R^2:	1.000	DL (ng)	9.97								

Project Name PCS - 30B
AECOM Project # 60402248.10



Sampling Date	Analysis Date	Sample ID: Facility ID	Unit/Stack #	Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
2/10/2016	2/12/2016			500ng ref			500.00	42,160	502.0	100.4%								
				1000ng			1000.00	85,250	1016.6	101.7%								
				2000ng			2000.00	167,500	1998.9	99.9%								
				4000ng			4000.00	331,400	3956.4	98.9%								
				6000ng			6000.00	504,700	6026.0	100.4%								
				ICV			2000.00	168,700	2013.3	100.7%								
				CCV			2000.00	167,700	2001.3	100.1%								
2/11/2016	2/12/2016	PCS	Calciner #1 -	Stack 1A	OL304567	Section 1		389,400	4649.0		4976.2	7.0%	57.65	51.63	48.81	40.47	116.65	5.77
						Section 2		27,590	327.2									
		PCS	Calciner #1 -	Stack 1B	OL321213	Section 1		193,500	2309.4		2643.9	14.5%	57.48	45.99				
						Section 2		28,200	334.4									
2/11/2016	2/12/2016	PCS	Calciner #1 -	Stack 2A	OL306813	Section 1		412,900	4929.7		4942.2	0.3%	52.78	55.75	49.98	49.18	129.78	11.53
						Section 2		1,056	12.5									
		PCS	Calciner #1 -	Stack 2B	OL321115	Section 1		196,200	2341.7		2341.7	0.0%	52.95	44.22				
						Section 2		0	0.0									
				CCV			2000.00	158,900	1896.2	94.8%								
2/11/2016	2/12/2016	PCS	Calciner #1 -	Stack 3A	OL321152	Section 1		393,400	4696.8		4705.5	0.2%	55.64	48.62	46.99	39.05	108.64	3.47
						Section 2		730	8.7									
		PCS	Calciner #1 -	Stack 3B	OL304582	Section 1		222,700	2658.2		2658.2	0.0%	58.60	45.36				
						Section 2		0	0.0									
				CCV			2000.00	164,300	1960.7	98.0%								
															Average:	118		

Analyst: Nicole Lancaster Date 2/12/2016

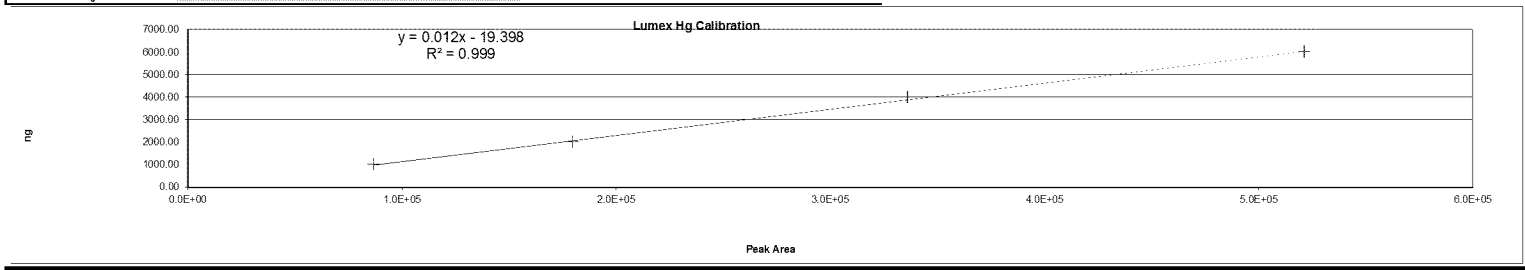
Reviewer: Reviewed by: Bob Jongleux Date 2/12/16 @2010

AECOM

QC Summary

Slope:	1.16E-02	MDL (ng)	9.97	Temp. Profile #	3	Response Factor		Spike	2000	min	max
Intercept:	-23.69	DCS (ng)	12.19	Air Flow (l/min)	4	0.01102				1000	3000
R^2:	0.999	DL (ng)	9.97								

Project Name PCS - 30B
AECOM Project # 60402248.10



Sampling Date	Analysis Date	Sample ID: Facility ID	Unit/Stack #	Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
2/13/2016	2/15/2016			500ng ref			500.00	45,390	505.0	101.0%								
				1000ng			1000.00	86,790	987.2	98.7%								
				2000ng			2000.00	179,600	2068.3	103.4%								
				4000ng			4000.00	336,100	3891.2	97.3%								
				6000ng			6000.00	521,300	6048.3	100.8%								
				ICV			2000.00	177,000	2038.0	101.9%								
				CCV			2000.00	175,700	2022.8	101.1%								
2/13/2016	2/15/2016	PCS	Calciner #2 -	Stack 1A	OL304526	Section 1		430,700	4993.0		4993.0	0.0%	54.76	54.66	52.56	40.73	111.51	3.99
						Section 2		0	0.0									
		PCS	Calciner #2 -	Stack 1B	OL232758	Section 1		244,300	2821.9		2822.4	0.0%	55.93	50.46				
						Section 2		47	0.5									
2/13/2016	2/15/2016	PCS	Calciner #2 -	Stack 2A	OL304530	Section 1		425,200	4929.0		4930.2	0.0%	51.43	56.97	55.28	42.31	108.79	3.06
						Section 2		111	1.2									
		PCS	Calciner #2 -	Stack 2B	OL321064	Section 1		239,900	2770.6		2773.5	0.1%	51.76	53.58				
						Section 2		262	2.9									
				CCV			2000.00	180,000	2072.9	103.6%								
2/13/2016	2/15/2016	PCS	Calciner #2 -	Stack 3A	OL304748	Section 1		418,500	4850.9		4852.8	0.0%	51.62	55.26	52.70	43.91	113.34	4.86
						Section 2		164	1.8									
		PCS	Calciner #2 -	Stack 3B	OL321028	Section 1		228,600	2639.0		2643.1	0.2%	52.72	50.14				
						Section 2		374	4.1									
				CCV			2000.00	174,300	2006.5	100.3%								

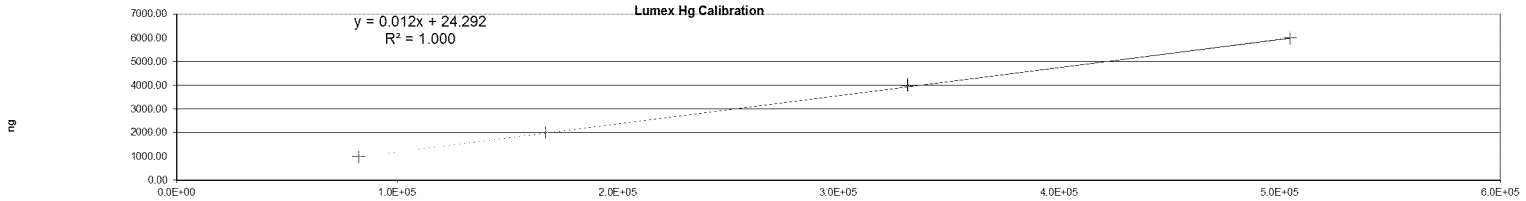
Analyst: Nicole Lancaster Date 2/15/2016

Reviewer: Stephanie Chesebro Date 2/16/2016

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00581

AECOM												
	Slope:	1.19E-02	MDL (ng)	9.97	Temp. Profile #	3	Response Factor		Spike	2000	min	max
QC Summary	Intercept:	12.16	DCS (ng)	12.19	Air Flow (l/min)	4	0.01186				1000	3000
	R^2:	1.000	DL (ng)	9.97								

Project Name PCS - 30B
AECOM Project # 60402248.10



Sampling Date	Analysis Date	Sample ID: Facility ID	Unit/Stack #	Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
2/10/2016	2/12/2016			500ng ref			500.00	42,160	514.3	102.9%								
				1000ng			1000.00	82,520	995.1	99.5%								
				2000ng			2000.00	167,500	2007.3	100.4%								
				4000ng			4000.00	331,400	3959.5	99.0%								
				6000ng			6000.00	504,700	6023.8	100.4%								
				ICV			2000.00	168,700	2021.6	101.1%								
				CCV			2000.00	164,300	1969.2	98.5%								
2/11/2016	2/12/2016	PCS	Calciner #3 -	Stack 1A	OL304643	Section 1		355,500	4246.6		4314.6	1.6%	41.32	56.02	52.44	56.06	115.82	6.83
						Section 2		5,732	68.0									
		PCS	Calciner #3 -	Stack 1B	OL321218	Section 1		167,400	2006.1		2097.8	4.6%	42.94	48.86				
						Section 2		7,734	91.7									
2/11/2016	2/12/2016	PCS	Calciner #3 -	Stack 2A	OL306818	Section 1		349,400	4173.9		4384.2	5.0%	44.78	53.25	51.13	46.49	104.08	4.15
						Section 2		17,730	210.3									
		PCS	Calciner #3 -	Stack 2B	OL321027	Section 1		176,500	2114.5		2217.3	4.9%	45.25	49.00				
						Section 2		8,670	102.8									
				CCV			2000.00	167,800	2010.9	100.5%								
2/11/2016	2/12/2016	PCS	Calciner #3 -	Stack 3A	OL304565	Section 1		381,400	4555.1		4560.7	0.1%	50.97	50.24	50.00	39.61	100.95	0.48
						Section 2		468	5.6									
		PCS	Calciner #3 -	Stack 3B	OL321450	Section 1		212,300	2540.9		2540.9	0.0%	51.07	49.75				
						Section 2		0	0.0									
				CCV			2000.00	165,300	1981.1	99.1%								

Average Spike Recovery: *106.9*

Analyst: Nicole Lancaster Date 2/12/2016

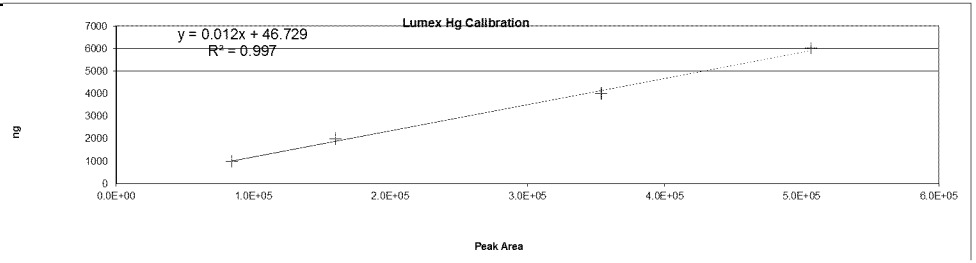
Reviewer: Bob Jongleux Date 2/13/2016

AECOM

QC Summary

Slope:	1.16E-02	MDL (ng)	9.97	Temp. Profile #	3	Response Factor		Spike	2000	min	max
Intercept:	28.70	DCS (ng)	12.19	Air Flow (l/min)	4	0.01181				1000	3000
R^2:	0.998	DL (ng)	9.97								

Project Name PCS - 30B
AECOM Project # 60402248.10



Sampling Date	Analysis Date	Sample ID: Facility ID	Unit/Stack #		Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
2/10/2016	2/11/2016				500ng ref			500.00	42,340	521.5	104.3%								
					1000ng			1000.00	84,520	1012.3	101.2%								
					2000ng			2000.00	160,000	1890.8	94.5%								
					4000ng			4000.00	354,000	4148.6	103.7%								
					6000ng			6000.00	506,800	5926.9	98.8%								
					ICV			2000.00	169,400	2000.2	100.0%								
					CCV			2000.00	174,500	2059.5	103.0%								
2/10/2016	2/11/2016	PCS	Calciner #4	-	Stack 1A	OL328484	Section 1		365,600	4283.6		4289.7	0.1%	49.91	45.88	49.45	32.94	82.20	7.22
							Section 2		523	6.2									
		PCS	Calciner #4	-	Stack 1B	OL304707	Section 1		212,900	2506.4		2512.6	0.2%	47.39	53.02				
							Section 2		520	6.1									
2/10/2016	2/11/2016	PCS	Calciner #4	-	Stack 2A	OL328302	Section 1		341,900	4007.7		4011.5	0.1%	45.49	44.22	45.34	41.65	94.73	2.47
							Section 2		319	3.8									
		PCS	Calciner #4	-	Stack 2B	OL321049	Section 1		179,600	2118.9		2118.9	0.0%	45.61	46.46				
							Section 2		0	0.0									
					CCV			2000.00	170,500	2013.0	100.6%								
2/10/2016	2/11/2016	PCS	Calciner #4	-	Stack 3A	OL304654	Section 1		357,000	4183.5		4184.2	0.0%	45.65	47.85	47.12	45.25	103.27	1.54
							Section 2		62	0.7									
		PCS	Calciner #4	-	Stack 3B	OL321104	Section 1		179,100	2113.1		2113.1	0.0%	45.54	46.40				
							Section 2		0	0.0									
					CCV			2000.00	165,600	1956.0	97.8%								

Analyst: Nicole Lancaster Date 2/11/2016

Reviewer: Stephanie Chesebro Date 2/12/2016

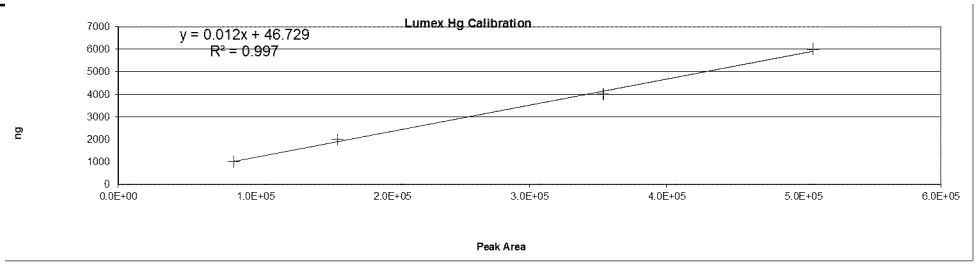
17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00583

AECOM

QC Summary

Slope:	1.16E-02	MDL (ng)	25.92	Temp. Profile #	3	Response Factor		Spike	2000	min	max
Intercept:	28.70	DCS (ng)	11.89	Air Flow (l/min)	4	0.01181				1000	3000
R^2:	0.998	DL (ng)	11.89								

Project Name PCS - 30B
AECOM Project # 60402248.10



Sampling Date	Analysis Date	Facility ID	Unit/Stack #	Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
2/8/2016	2/11/2016			500ng ref			500.00	42,340	521.5	104.3%								
				1000ng			1000.00	84,520	1012.3	101.2%								
				2000ng			2000.00	160,000	1890.8	94.5%								
				4000ng			4000.00	354,000	4148.6	103.7%								
				6000ng			6000.00	506,800	5926.9	98.8%								
				ICV			2000.00	169,400	2000.2	100.0%								
				CCV			2000.00	179,900	2122.4	106.1%								
2/8/2016	2/11/2016	PCS	Calciner #5 -	Stack 1A	OL328488	Section 1		385,700	4517.5		4736.2	4.8%	49.61	55.15	53.25	39.72	98.52	3.58
						Section 2		18,520	218.7									
		PCS	Calciner #5 -	Stack 1B	OL321111	Section 1		216,700	2550.7		2550.8	0.0%	49.68	51.35				
						Section 2		11	0.1									
2/8/2016	2/11/2016	PCS	Calciner #5 -	Stack 2A	OL321123	Section 1		361,500	4235.8		4439.0	4.8%	48.83	49.95	50.76	35.76	87.32	1.60
						Section 2		17,200	203.1									
		PCS	Calciner #5 -	Stack 2B	OL304686	Section 1		208,200	2451.7		2480.2	1.2%	48.09	51.57				
						Section 2		2,407	28.4									
				CCV			2000.00	169,500	2001.3	100.1%								
2/8/2016	2/11/2016	PCS	Calciner #5 -	Stack 3A	OL328317	Section 1		357,800	4192.8		4227.4	0.8%	47.24	47.15	49.87	39.45	93.17	5.45
						Section 2		2,932	34.6									
		PCS	Calciner #5 -	Stack 3B	OL321185	Section 1		194,600	2293.5		2445.8	6.6%	46.51	52.59				
						Section 2		12,900	152.3									
				CCV			2000.00	174,500	2059.5	103.0%								

Analyst: Nicole Lancaster Date 2/11/2016

Reviewer: Stephanie Chesebro Date 2/12/2016

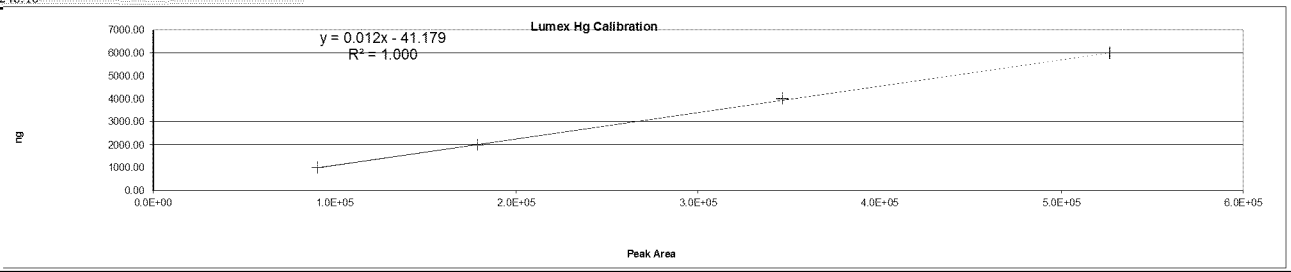
17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00584

AECOM

QC Summary

Slope:	1.15E-02	MDL (ng)	11.52	Temp. Profile #	3	Response Factor		Spike	2200	min	max
Intercept:	-35.69	DCS (ng)	18.89	Air Flow (l/min)	4	0.01087				1100	3300
R^2:	1.000	DL (ng)	11.52								

Project Name PCS - 30B
AECOM Project # 60402248.10



Sampling Date	Analysis Date	Sample ID: Facility ID	Unit/Stack #	Sample #	Trap #	Fraction	Known ng	Peak Area	ng	% Recovery	Trap Total ng	% Breakthrough	Sample Volume (Std L)	Hg Conc (µg/dscm)	Average Hg Conc (µg/dscm)	C_{rec}	Spike Recovery %	Pair %D
2/19/2016				500ng ref			500.00	45,990	493.7	98.7%								
				1000ng			1000.00	90,780	1009.2	100.9%								
				2000ng			2000.00	178,800	2022.3	101.1%								
				4000ng			4000.00	346,400	3951.5	98.8%								
				6000ng			6000.00	526,400	6023.3	100.4%								
				ICV			2000.00	184,500	2088.0	104.4%								
				CCV			2000.00	177,200	2003.9	100.2%								
2/19/2016	2/19/2016	PCS	Calciner #6 -	Stack 1A	OL211412	Section 1		464,523	5311.1		5312.1	0.0%	50.47	61.66	59.31	48.28	110.76	3.97
						Section 2		94	1.0									
		PCS	Calciner #6 -	Stack 1B	OL232760	Section 1		255,500	2905.2		2905.2	0.0%	51.01	56.95				
						Section 2		0	0.0									
2/19/2016	2/19/2016	PCS	Calciner #6 -	Stack 2A	OL211407	Section 1		430,900	4924.1		5003.6	1.6%	50.18	55.87	56.18	41.63	94.96	0.55
						Section 2		7,318	79.6									
		PCS	Calciner #6 -	Stack 2B	OL232890	Section 1		250,900	2852.2		2852.2	0.0%	50.49	56.50				
						Section 2		0	0.0									
				CCV			2000.00	172,400	1948.7	97.4%								
2/19/2016	2/19/2016	PCS	Calciner #6 -	Stack 3A	OL211410	Section 1		459,700	5255.6		5310.3	1.0%	51.17	60.78	58.71	46.11	107.25	3.54
						Section 2		5,032	54.7									
		PCS	Calciner #6 -	Stack 3B	OL235498	Section 1		256,800	2920.1		2922.0	0.1%	51.60	56.63				
						Section 2		173	1.9									
				CCV			2000.00	171,800	1941.8	97.1%								
															Average		104.3	2.69

Analyst: Nicole Lancaster Date 2/19/2016

Reviewer: Stephanie Chesebro Date 2/20/2016

17cv1906 Sierra Club v. EPA - 6/22 Production ED_001523_00007569-00585

ERA
A Waters Company

February 18, 2016

Stephanie Chesebro
AECOM
900 Perimeter Park Dr.
Morrisville, NC 27560

Enclosed is your final report for ERA's Stationary Source Audit Sample (SSAS) Program. Your final report includes an evaluation of all results submitted by your laboratory to ERA.

Data Evaluation Protocols: All analytes in ERA's SSAS Program have been evaluated comparing the reported result to the acceptance limits generated using the criteria contained in the TNI SSAS Table.

For any "Not Acceptable" results, please contact your state regulator for any corrective action requirements.

Thank you for your participation in ERA's SSAS Program. If you have any questions, please contact our Proficiency Testing Department at 1-800-372-0122.

Sincerely,

Pat Larson

Patrick Larson
Quality Officer

cc: Project File Number 011216A

ERA
A Waters Company

Recipient Type	Report Recipient	Contact	Project ID
Agency	NC-Division of Air Quality Raleigh (SSAS) 1641 Mail Service Center Raleigh, NC 27699 USA	Gregg O'Neal III, P.E. gregg.oneal@ncdenr.gov Phone: 919-707-8415	
Facility	PCS Phosphate 1530 NC Hwy 306 S Aurora, NC 27806 USA	Brad Lee blee@pcsphosphate.com Phone: 252-322-8270	
Lab	PCS Phosphate 1530 NC Hwy 306 S Aurora, NC 27806 USA	Brad Lee blee@pcsphosphate.com Phone: 252-322-8270	
Tester	AECOM 900 Perimeter Park Dr. Morrisville, NC 27560 USA	Stephanie Chesebro Stephanie.Chesebro@URS.com Phone: 919-461-1539	60402248.09

011216A Laboratory Exception Report

A Waters Company

Brad Lee
PCS Phosphate
1530 NC Hwy 306 S
Aurora, NC 27806
252-322-8270

EPA ID: **Not Reported**
ERA Customer Number: **T217202**

Evaluation Checks

There are no values reported with < where the assigned value was greater than 0.

Not Acceptable Evaluations

There were no Not Acceptable evaluations for this study.

ERA
A Waters Company

Final Report Results For Laboratory
PCS Phosphate

ERA
A Waters Company

SSAP Evaluation Report

Project Number: **011216A**

ERA Customer Number: **T217202**

Laboratory Name: **PCS Phosphate**

Inorganic Results

011216A Evaluation Final Complete Report

A Waters Company

Brad Lee
PCS Phosphate
1530 NC Hwy 306 S
Aurora, NC 27806
252-322-8270

EPA ID: **Not Reported**
ERA Customer Number: **T217202**

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
SSAP Fluoride in Impinger Solution (cat# 1441, lot# 011216A) Study Dates: 01/12/16 - 02/18/16									
1730	Fluoride	mg/dscm	0.961	1.00	0.850 - 1.15	Acceptable	EPA 13B 2000	2/16/2016	

ERA
A Waters Company

February 18, 2016

Stephanie Chesebro
AECOM
900 Perimeter Park Dr.
Morrisville, NC 27560

Enclosed is your final report for ERA's Stationary Source Audit Sample (SSAS) Program. Your final report includes an evaluation of all results submitted by your laboratory to ERA.

Data Evaluation Protocols: All analytes in ERA's SSAS Program have been evaluated comparing the reported result to the acceptance limits generated using the criteria contained in the TNI SSAS Table.

For any "Not Acceptable" results, please contact your state regulator for any corrective action requirements.

Thank you for your participation in ERA's SSAS Program. If you have any questions, please contact our Proficiency Testing Department at 1-800-372-0122.

Sincerely,

Pat Larson

Patrick Larson
Quality Officer

cc: Project File Number 011216B

ERA
A Waters Company

Recipient Type	Report Recipient	Contact	Project ID
Agency	NC-Division of Air Quality Raleigh (SSAS) 1641 Mail Service Center Raleigh, NC 27699 USA	Gregg O'Neal III, P.E. gregg.oneal@ncdenr.gov Phone: 919-707-8415	
Facility	PCS Phosphate 1530 NC Hwy 306 S Aurora, NC 27806 USA	Brad Lee blee@pcsphosphate.com Phone: 252-322-8270	
Lab	PCS Phosphate 1530 NC Hwy 306 S Aurora, NC 27806 USA	Brad Lee blee@pcsphosphate.com Phone: 252-322-8270	
Tester	AECOM 900 Perimeter Park Dr. Morrisville, NC 27560 USA	Stephanie Chesebro Stephanie.Chesebro@URS.com Phone: 919-461-1539	60402248.09

011216B Laboratory Exception Report

A Waters Company

Brad Lee
PCS Phosphate
1530 NC Hwy 306 S
Aurora, NC 27806
252-322-8270

EPA ID: **Not Reported**
ERA Customer Number: **T217202**

Evaluation Checks

There are no values reported with < where the assigned value was greater than 0.

Not Acceptable Evaluations

There were no Not Acceptable evaluations for this study.

ERA
A Waters Company

Final Report Results For Laboratory
PCS Phosphate

ERA
A Waters Company

SSAP Evaluation Report

Project Number: **011216B**

ERA Customer Number: **T217202**

Laboratory Name: **PCS Phosphate**

Inorganic Results

011216B Evaluation Final Complete Report

ERA
A Waters Company

Brad Lee
PCS Phosphate
1530 NC Hwy 306 S
Aurora, NC 27806
252-322-8270

EPA ID: **Not Reported**
ERA Customer Number: **T217202**

TNI Analyte Code	Analyte	Units	Reported Value	Assigned Value	Acceptance Limits	Performance Evaluation	Method Description	Analysis Date	Analyst Name
SSAP Fluoride in Impinger Solution (cat# 1441, lot# 011216B) Study Dates: 01/12/16 - 02/18/16									
1730	Fluoride	mg/dscm	6.76	7.00	5.95 - 8.05	Acceptable	EPA 13B 2000	2/16/2016	

PCS Phosphate

Aurora

CALCINER SOURCE PERFORMANCE TESTING- (WEEK 2 / 3)

METHOD 13-B MULTI-TEST ANALYSES WORKSHEET

Analyst : John A. Bailey

Date : 2-16-16

F- Curve Standards	mV	ppm	
10.0 ppm	47.9	10.00	
1.0 ppm	106.3	1.01	Slope- -58.4
0.3 ppm	136.2	0.304	Acceptable slope range
Blank (PCS)	216.2	0.0000	-54.0 mv to -60.0 mv
Quality Assurance	ERA QA		
Lot Number	240-506 (Known Value)		
Certified Value	3.33 mg/l	3.31	Observed Value ppm
SSAP			
Observ. Value ppm			

Midrange 5.0 ppm std= * 5.00

100.0 ppm Std = 97.0 N/A

% Recovery Midrange = 100 %

% Recovery QA = 99.4 %

% Recovery Spike = #1= 95% #2= 96 %

% Difference Duplic # 1 2 %

% Difference Duplic # 2 7 %

Fluoride curve correlation coeff.= 1.0000

TISAB lot # = 7508063

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
1	Cal #2	2/2/2016	10	1000 mls	0.267
2	Cal #2	2/11/2016	10	1000 mls	0.234
3	Cal #2	2/11/2016	10	1000 mls	0.310
			10	1000 mls	

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
1	Cal #4	2/1/2016	10	1000 mls	0.178
2	Cal #4	2/1/2016	10	1000 mls	0.189
3	Cal #4	2/1/2016	10	1000 mls	0.191
Duplic	Cal #4	2/1/2016	10	1000 mls	0.195

Blank= 0.0000 PPM

Mid-range std.= 4.98 PPM

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
X	X	X	10	1000 mls	
X	X	X	10	1000 mls	
X	X	X	10	1000 mls	
X	X	X	10	1000 mls	

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
1	Cal #4 Spike		10	1000 mls	1.13
	PT 011216"A"		10	1000 mls	0.961
X	X	X	10	1000 mls	
X	X	X	10	1000 mls	

Spike value = 1.00 PPM

(PT-Week #2)

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
1	Cal #1	2/10/2016	10	1000 mls	0.261
2	Cal #1	2/10/2016	10	1000 mls	0.180
3	Cal #1	2/10/2016	10	1000 mls	0.256
			10	1000 mls	

Run #	Source	Sample Date	Aliquot	Sample volume	
1	Cal #3	2/13/2016	10	1000 mls	0.248
2	Cal #3	2/13/2016	10	1000 mls	0.256 0.134
3	Cal #3	2/13/2016	10	1000 mls	0.226
Duplic	Cal #3	2/13/2016	10	1000 mls	0.210

Run #	Source	Sample Date	Aliquot	Sample volume	
1	* Cal #3 Spike		10	1000 mls	1.21
	PT 011216"B"		10	1000 mls	0.96
X	X	X	10	1000 mls	
X	X	X	10	1000 mls	

POST

F- Curve Standards	mV	ppm
10.0 ppm	47.9	10.00
1.0 ppm	106.3	1.01
0.3 ppm	135.4	0.314
0.1ppm	107.1	0.980

* Spike value = 1.00 PPM

(PT- Week #3)

PCS Phosphate

Aurora

CALCINER SOURCE PERFORMANCE TESTING- (WEEK #1)

METHOD 13-B MULTI-TEST ANALYSES WORKSHEET

Analyst : John A. Bradley

Date : 2-1-16

F- Curve Standards	mV	ppm	
10.0 ppm	45.1	10.00	
1.0 ppm	103.0	1.00	Slope- -57.9
0.3 ppm	133.6	0.300	Acceptable slope range
Blank (PCS)	0.0000		-54.0 mv to -60.0 mv
Quality Assurance	ERA QA		
Lot Number	240-506 (Known Value)		
Certified Value	3.33 mg/l	3.23	Observed Value ppm
SSAP			
0112160		21.9	
Observ. Value ppm			

('Week #1)

Midrange 5.0 ppm std= * 5.07

100.0 ppm Std = 102 N/A

% Recovery Midrange = 101.4 %

% Recovery QA = 97 %

% Recovery Spike = 95 %

% Difference Duplic # 1 -4.8 %

% Difference Duplic # 2 1.5 %

Fluoride curve correlation coeff.= 1.0000

TISAB lot # = 1508063

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
1	Cal.#5	1/26/2015	10	1000 mls	0.211
2	Cal.#5	1/26/2015	10	1000 mls	0.186
3	Cal.#5	1/26/2015	10	1000 mls	0.101
*3-Dup	Cal.#5	1/26/2015	10	1000 mls	0.106

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
1	Cal. #6	1/26/2015	10	1000 mls	0.199
2	Cal. #6	1/26/2015	10	1000 mls	0.169
3	Cal. #6	1/26/2015	10	1000 mls	0.266
*3-Dup	Cal. #6	1/26/2015	10	1000 mls	0.262

Blank= 0.0000 PPM

Mid-range std.= 5.07 PPM

Run #	Source	Sample Date	Aliquot	Sample volume	ppm

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
1	Run # 1 Spike	1/26/2015	0.1	1000 mls	1.15
	Cal. #6				

Spike value = 1.00 PPM

Run #	Source	Sample Date	Aliquot	Sample volume	ppm
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X

Run #	Source	Sample Date	Aliquot	Sample volume	
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X

Run #	Source	Sample Date	Aliquot	Sample volume	
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X
X	X	X	X	X	X

POST

F- Curve Standards	mV	ppm
10.0 ppm	45.1	10.00
1.0 ppm	103.8	0.977
0.3 ppm	133.9	0.296
0.1ppm	160.4	0.104

APPENDIX F
TEST PROTOCOLS AND RELATED CORRESPONDENCE

PotashCorp®
Helping Nature Provide

PotashCorp - Aurora

CERTIFIED MAIL

January 19, 2016

Mr. Robert Fisher, Regional Supervisor
NCDEQ - Division of Air Quality
943 Washington Square Mall
Washington, North Carolina 27889

Subject: **PCS Phosphate Company, Inc.**
Permit No. 4176T53
Facility ID: 0700071
Calciner No. 1-6 Plants (ep 201-206)
Compliance Tests – Particulate, Total Fluoride, Mercury and Sulfur Dioxide

Dear Robert:

As per the requirements of the Air Quality Permit No 4176T53 General Emissions and Reporting Requirements 3.JJ.1 an air emission testing protocol is being provided prior to air pollution testing. Please find attached for your approval, the protocol for the subject sampling at Calciners 1-6 (ep 201 – 206)

If there are any questions concerning this subject, please contact me at 252-322-8270.

Respectfully,

Pamela Jestness
Sr. Environmental Engineer
PotashCorp-Aurora (PCS Phosphate Company, Inc.)

Enclosures

Pc:	File/lab notebook	(w/encl)	R. Smith	(w/ summary only)
	M. Brom	(w/ encl)	K. Alnahdy	(w/ summary only)
	Robert Fisher – 2 copies	(w/encl)		
	T. Baker	(w/ summary only)		
ec:	R. Bonner	(w/ summary only)		

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ED_001523_00007569-00601

PROTOCOL SUBMITTAL FORM (REV. 2010a)
DIVISION OF AIR QUALITY

Purpose: The goals of the Protocol Submittal Form are to initiate communication between representatives of the permitted facility, the testing consultants, and the DAQ as well as to identify and resolve any specific testing concerns prior to testing.

Instructions: **Use Guidance Document to fill out this form. Submit all forms and additional information to the DAQ Regional Supervisor at least 45 days prior to testing.** Complete one form for each sampling location. If this form does not supply sufficient space to completely answer all questions or if additional relevant information is necessary, **attach** additional documentation and/or information to the original form. Questions and/or comments should be directed to the appropriate Regional Supervisor.

This form and its Guidance Document are available from the DAQ website (http://daq.state.nc.us/enf/sourcetest/)

Specify Appropriate Regional Office: (check one)

☐ Asheville ☐ Fayetteville ☐ Mooresville ☐ Raleigh ☒ Washington ☐ Wilmington ☐ Winston-Salem

Facility Name: **PCS Phosphate Company, Inc.** Facility ID No: **07-00071**	Testing Company: **AECOM**
Facility Contact Person / mailing address & email: **Pamela Jestness** **PCS Phosphate Company** **1530 NC Hwy. 306 South** **Aurora, NC 27806** **Beaufort County** Email Address: **PKJestness@potashcorp.com**	Testing Company Contact Person / mailing address & email: **Bob Jongleux** **AECOM** **1600 Perimeter Park Drive** **Suite 400** **Morrisville, NC 27560** Email Address: **bob.jongleux@aecom.com**
Phone: 252.322.8270 Mobile No.: 252-402-6990 Fax: 252.322.~~4444~~ 8083	Phone: 919.464.1242 Mobile No.: 919.949.2950 Fax: 919.461.1415
Air Permit Number & Revision: **4176TS3**	Permitted Source Name and ID No.: **Calciner No. 1-No.6 (EP-201 – 206)**
Permitted Maximum Process Rate: **105.1 tons per hour (nominal feed)**	Maximum Normal Operation Process Rate: **See Attachment A.**
	Target Process Rate for Testing: **See Attachment A.**

1.1) What is the specific purpose for the proposed testing? (permit condition, NSPS, NESHAP, etc, see guidance doc):
Permit 2.1.2.A.1 and 2.1.2A.2(a)
Initial testing for NESHAP - 40 CFR Part 63 Subpart AA for Hg and Fl^-
Is this an initial performance test? ☒ Yes or ☒ No

1.2) List all state and federal regulations that apply to the proposed testing (see guidance doc):
15A NCAC 2D.1111 and 0501 (e) and, 40 CFR 63 Subpart AA

1.3) Will the test results be used for other regulatory purposes (e.g., emission inventories, permit application, etc.) beyond that stated above?
☒ Yes or ☐ No If yes, explain. **Annual emission inventories**

1.4) How will production/process & control device data be documented during testing (list specific control equipment, process parameters, instrumentation that will be used, frequency of data collection, collected by computer/manually, etc.)? TEST WILL NOT BE ACCEPTED WITHOUT APPROPRIATE PRODUCTION/PROCESS & CONTROL DEVICE OPERATION DATA.
Data to be recorded by control room: includes feed rate (tons per hour), feed moisture, coal feed rate, absorber change in pressure, scrubber water flow rate, and WESP secondary voltage.

1.5) Provide a brief description of the source (including control equipment) and **attach** source or process flow diagram from source through stack exit: **The calcining operation includes six fluidized-bed calciners which encompass four distinct fluid beds, each performing a different function. The temperature in the calciners is maintained high enough to oxidize carbonaceous material adhered to the phosphate rock. The temperature of the calcining bed is maintained below 1600°F by direct injection of bituminous coal/coke fuel mixture. Vent streams from the preheat bed and the aftercooler chambers exhaust through individual duplex cyclones and a common venturi scrubber. In addition to the venturi scrubbers, Calciners are equipped with wet electrostatic precipitators (WESPs) for additional particulate control. See attached process diagrams.**

PROTOCOL SUBMITTAL FORM (REV. 2010a)

DIVISION OF AIR QUALITY

1.6) Provide a brief description of the sampling location, **attach** schematic of sampling location, and indicate whether concurrent testing will be conducted at other sampling locations (Approval of protocol without this data will not exempt you from Method 1 criteria):
The number and location of the sampling points is determined by EPA Method 1. See attached stack schematic for details of sampling location.

2.1) Provide the following information for each test parameter.

Target Pollutant	Proposed Test Method	Number of Test Runs	Test Run Duration	# of Sampling Points	Comments
PM	5	3	72 minutes	24	12 points per traverse – 3 minutes per point
Stack Volumetric Flow	2	3	72 minutes	24	In conjunction with Method 5 - 12 points per port
$PM_{Condensable}$	202	3	72 minutes	24	In conjunction with Method 5 – 12 points per port
MW	3	3	-	-	Assume MW of 29.00 based on default value for Combustion Source per historical plant convention
Fluoride	13B	3	72 minutes	24	Same time as M5/202 but as a separate run
Sulfur Dioxide	6C	3	60 minutes	3	3 point traverse – SO_2 on Calciner 4 only
Mercury	30B	3	60 minutes	1	Sample from center point of stack

2.2) **Will all testing be conducted in strict accordance with the applicable test methods?** If answer is no, **attach** complete documentation of all modifications and/or deviations to the applicable test methods.	☒ Yes	☐ No
2.3) Does the proposed sampling location meet the minimum EPA Method 1 criteria for acceptable measurement sites? **Attach** supporting documentation. **See Attachment B**	☒ Yes	☐ No
2.4) Has cyclonic flow been documented at this source (EPA Method 1 Section 11.4)? ABSENCE OF CYCLONIC FLOW MUST BE VERIFIED DURING CURRENT TESTING.	☒ Yes	☐ No
2.5) Will the oxygen concentration be determined by ☐ EPA Method 3 via Orsat or ☐ strict EPA Method 3A (specify) If answer is no, see Question 2.2 above. (Fyrites are NOT allowed per 15A NCAC 2D .2606) **Molecular weight will be based on the default value for combustion sources and therefore O_2/CO_2 is not necessary to collect.**	☐ Yes	☒ No
2.6) Do any of the proposed test methods require analysis of EPA audit samples? If yes, notify Regional Office a minimum of 45 days prior to testing to allow for audit sample preparation and shipment. **Request submitted and approved.**	☒ Yes	☐ No
2.7) Has all testing equipment been calibrated within the past year? If answer is no, explain.	☒ Yes	☐ No
2.8a) Have all calibration gases been certified by EPA Protocol 1 procedures? (Answer only as applicable)	☒ Yes	☐ No
2.8b) Is a dilution system (via EPA Method 205) proposed? (Answer only as applicable)	☐ Yes	☐ No
2.8c) **Attach** a summary of expected calibration gas concentrations for all proposed instrumental test methods.		

2.9) What is proposed test schedule? **DAQ Regional Supervisor must be notified a minimum of 15 days prior to the actual test date(s)** THIS FORM DOES NOT CONSTITUTE 15 DAY REGIONAL OFFICE NOTIFICATION **1/18/2016**

Additional Comments: **Regional office notified in December 2015.**

Signatures: Representatives from the permitted facility and the contracted testing company **must provide signatures** below certifying that the information provided on this form and any attached information is accurate and complete.

Permitted Facility Representative	Date	Testing Company Representative	Date
Name: Pamela Jestness	1/18/2016	Name: Bob Jongleux	1/18/2016
Title: Senior Environmental Engineer		Title: Senior Scientist	
Company: PCS Phosphate Company, Inc.		Company: AECOM	

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Attachment A

Calciner No. 1- No. 6 Process and Target Rates for Compliance Testing

		CALCINER #1			CALCINER #2			CALCINER #3			CALCINER #4			CALCINER #5			CALCINER #6		
		FEED	RUN HOURS	Actual Rate (tons/hour)	FEED	RUN HOURS	Actual Rate (tons/hour)	FEED	RUN HOURS	Actual Rate (tons/hour)	FEED	RUN HOURS	Actual Rate (tons/hour)	FEED	RUN HOURS	Actual Rate (tons/hour)	FEED	RUN HOURS	Actual Rate (tons/hour)
2015	JAN	30,968	584.6	53.0	29,517	575.6	51.3	29,995	546.1	54.9	29,765	604.2	49.3	32,464	626.4	51.8	34,465	685.4	50.3
	FEB	32,958	596.7	55.2	28,690	533.9	53.7	30,458	533.1	57.1	20,375	393.4	51.8	19,378	408.6	47.4	20,022	395.8	50.6
	MAR	43,745	713.4	61.3	30,422	487.6	62.4	35,865	597.7	60.0	7,593	112.2	67.7	27,793	488.5	56.9	0	0.0	--
	APR	41,427	684.1	60.6	40,552	675.1	60.1	31,050	530.2	58.6	42,804	706.5	60.6	39,264	652.8	60.1	0	0.0	--
	MAY	40,117	671.5	59.7	40,769	667.4	61.1	33,857	535.9	63.2	40,510	675.5	60.0	41,594	705.1	59.0	0	0.0	--
	JUNE	38,718	660.8	58.6	36,299	629.9	57.6	36,309	632.2	57.4	40,681	682.2	59.6	17,436	298.1	58.5	9,483	207.0	45.8
	JULY	38,593	727.1	53.1	32,140	579.3	55.5	39,757	703.4	56.5	35,485	632.9	56.1	39,431	711.7	55.4	29,489	510.4	57.8
	AUG	21,344	366.4	58.3	33,145	584.2	56.7	39,075	660.6	59.2	38,609	689.4	56.0	42,452	717.2	59.2	37,493	662.1	56.6
	SEPT	39,307	617.8	63.6	38,399	626.3	61.3	38,891	634.1	61.3	36,580	617.4	59.2	38,236	616.4	62.0	39,243	645.1	60.8
	OCT	32,723	559.4	58.5	42,967	742.0	57.9	33,092	562.2	58.9	44,454	743.0	59.8	40,072	631.7	63.4	20,407	341.9	59.7
	NOV	38,989	600.3	64.9	33,526	542.9	61.8	35,442	571.8	62.0	39,695	639.1	62.1	41,220	647.3	63.7	43,853	688.3	63.7
	DEC	38,498	689.2	55.9	41,563	742.1	56.0	35,573	651.5	54.6	36,680	713.6	51.4	23,113	407.8	56.7	30,274	549.7	55.1
Average		**36,449**	**622.6**	**58.6**	**35,666**	**615.5**	**57.9**	**34,947**	**596.6**	**58.6**	**34,436**	**600.8**	**57.8**	**33,538**	**576.0**	**57.8**	**22,061**	**390.5**	**55.6**
Target Rate				**58.6**			**57.9**			**58.6**			**57.8**			**57.8**			**55.6**

Production data for protocol

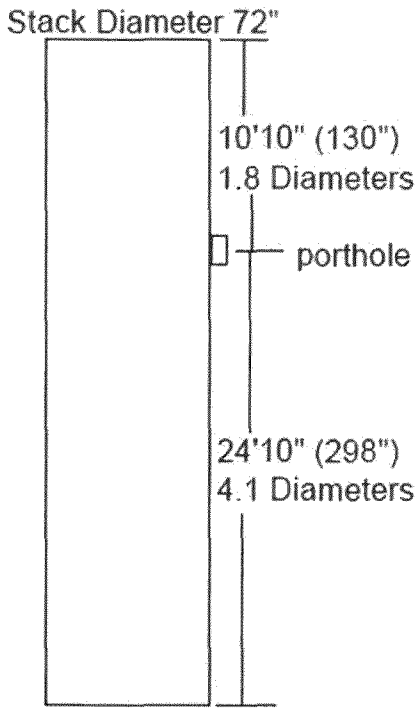
Calciner 2015 Production

ED_001523_00007569-00604

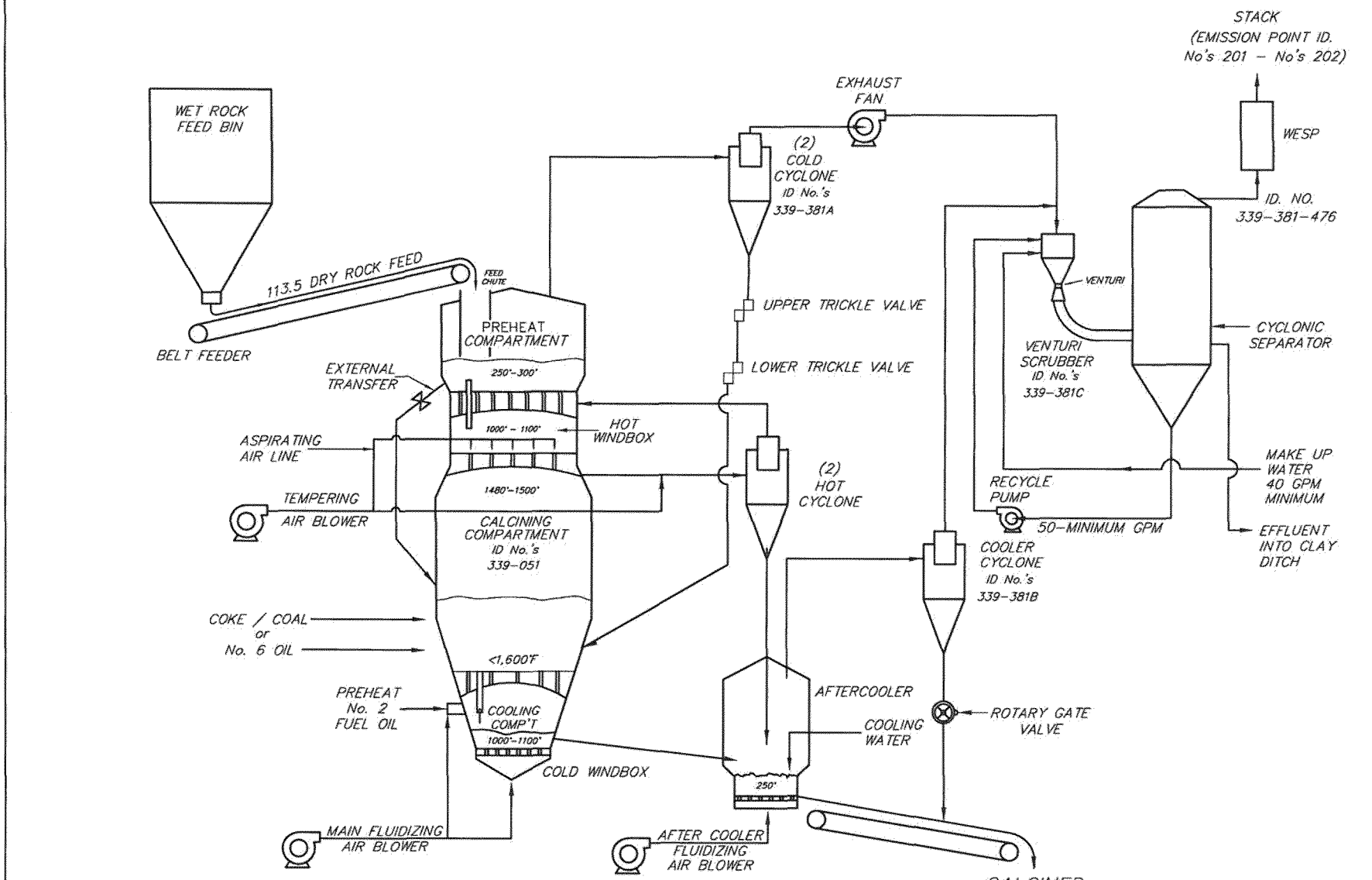
Attachment B

PCS Aurora

Calciner No.1-No.6 Test Location Schematic



17cv1906 Sierra Club v. EPA - 6/22 Production



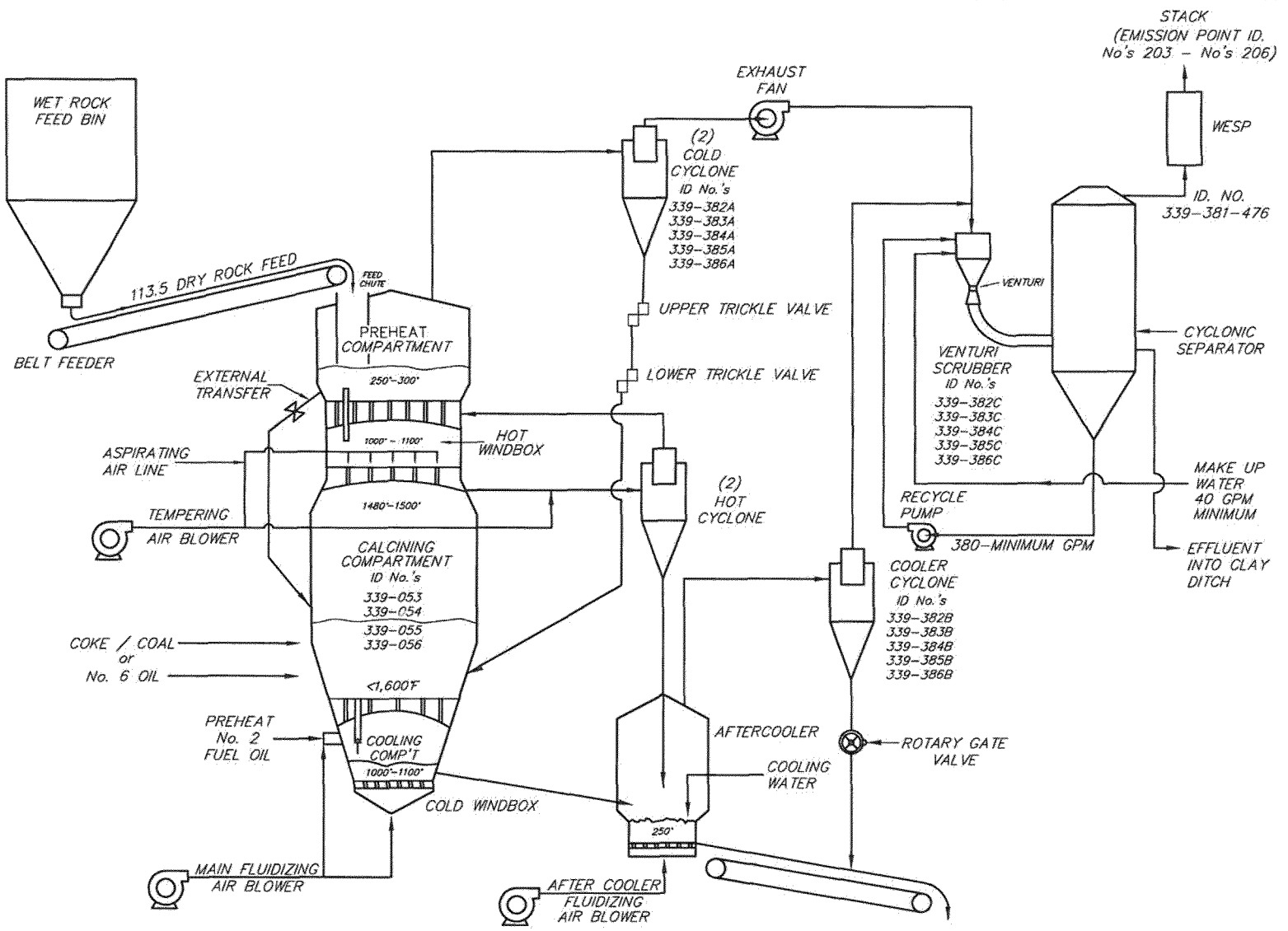
CALCINER PROCESS FLOW DIAGRAM
No. 1 & No. 2

DRAWN S.L.Paschall	PotashCorp Aurora	DRAWING TITLE FLOW MECHANICAL AREA – 039 PROCESS FLOW DIAGRAM OF CALCINER PROCESS No. 1 & No. 2	ENGINEERING JOB No.
CHECKED			DATE: 3/26/2011
APPROVED			SCALE: None
APPROVED			DRAWING No. AFM–039–046

U:\Engineering\Drawings\Flow Drawings\AFM-039-046.dwg, Model, 7/12/2011 12:43:17 PM, AUR1SLP, CutePDF Writer, ARCH A, 1:0.971429

ED_001523_00007569-00606

17cv1906 Sierra Club v. EPA - 6/22 Production



CALCINERS PROCESS FLOW DIAGRAM
No. 2–6 (IDENTICAL)

DRAWN S.L.Paschall	PotashCorp Aurora	DRAWING TITLE FLOW MECHANICAL AREA – 039 PROCESS FLOW DIAGRAM OF CALCINER PROCESS No. 3 thur 6 (IDENTICAL)	ENGINEERING JOB No.
CHECKED			DATE: 3/26/2011
APPROVED			SCALE: None
APPROVED			DRAWING No. AFM–039–047

U:\Engineering\Drawings\Flow Drawings\AFM-039-047.dwg, Model, 7/12/2011 12:49:04 PM, AUR1SLP, CutePDF Writer, ARCH A, 1:0.971429

ED_001523_00007569-00607

PCS AMENDED PETITION - ATTACHMENT E



PCS Calciner Testing
Casey F Bradford/JonesDay to: Fairchild, Susan 02/17/2016 12:06 PM
4-8119
Cc: "Barnett, Keith", "Jessica.DeMonte", RSmith, TBaker

Susan,

PCS wants to let you know that there have been some challenges with initial performance testing of mercury emissions from the Aurora calciners. We recently received preliminary test results for mercury emissions from 3 calciners that exceed the new mercury limit . Two other calciners passed their Hg tests. The sixth calciner was shut down due to an equipment failure, and PCS has requested that North Carolina DEQ issue a 2-week extension of the testing deadline for that calciner.

North Carolina DEQ is aware of the mercury results obtained so far. PCS discussed the results with the state today and is in the process of determining a plan for retesting the calciners that exceeded the limit. PCS also will test Calciner 6 for mercury in the near future. Final test reports are being prepared and will be submitted to the ERT in due course.

Based on preliminary data, it appears that the mercury content of calciner feed is significantly higher now than it was during prior ICR testing. However, PCS needs to complete a review of the relevant data before it can draw any conclusions about the results or whether the new mercury limit is achievable notwithstanding what appears to be significant variability in the mercury content of the feed. I will update you once we have more information.

Please let me know if you have any questions in the meantime.

Thanks,
Casey

Casey Fernung Bradford (bio)
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PCS 5/26/16 Presentation

Casey F Bradford/JonesDay 4-8119 to: Fairchild, Susan, Barnett, Keith 05/27/2016 04:00 PM

Cc: "Jessica.DeMonte", RSmith

Susan,

Attached is the PCS presentation from our 5/26/16 meeting on the mercury floor standard for existing calciners. Please let me know if you have any other questions about this information or PCS' request to revise the mercury floor standard. We appreciate EPA's attention to this matter which has a significant impact on the PCS Aurora facility.

Thanks,
Casey

NAI_1501071013_1_PCS Calciner Presentation 5_26_16.PPTX

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MACT Floor Emission Limit for Mercury (Hg) from Existing Phosphate Rock Calciners

PCS Phosphate Company, Inc.
Aurora, North Carolina
May 26, 2016

FRCP 408 Settlement Communication

Proposed Agenda

I. Hg MACT Floor Standard
II. ICR & Initial Compliance Test Results
III. PCS Hg Study (January – May 2016)
IV. Conclusions / Next Steps

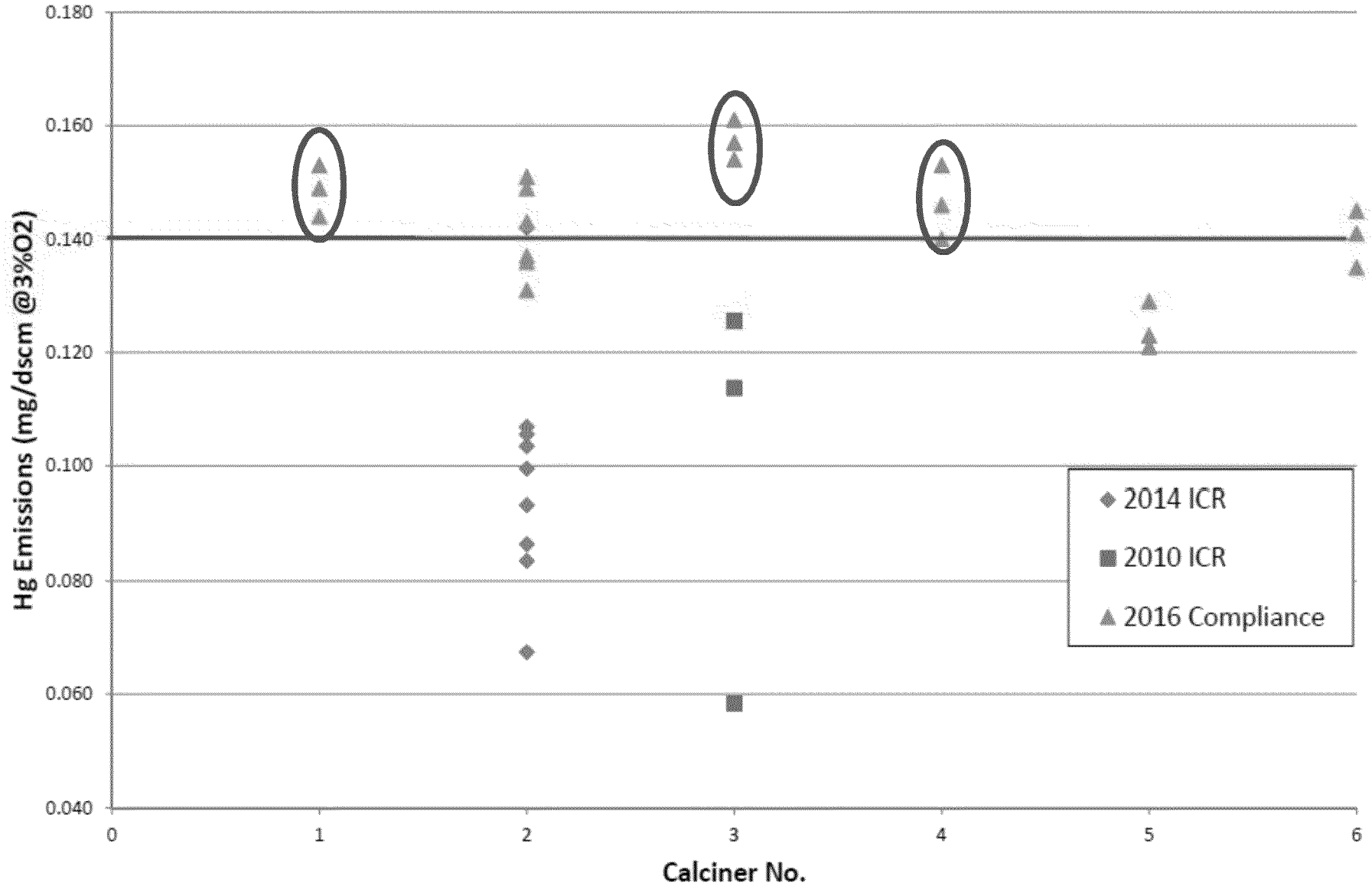
Questions welcome at any time

I. Hg Floor Standard

* CAA §112(D)(3)(B): Floor should be the average emissions already achieved by PCS calciners
* 2015 FINAL RULE
  - Set Hg floor at 0.14 mg/dscm at 3% O_2
  - Based on only 12 Hg emission test results for PCS calciners from 2010 & 2014 information collection requests (ICR's)

    "[T]he Agency does not anticipate that any facilities will need to install a new control device to meet the existing phosphate rock calciner Hg limit."
    80 FR 50,398.

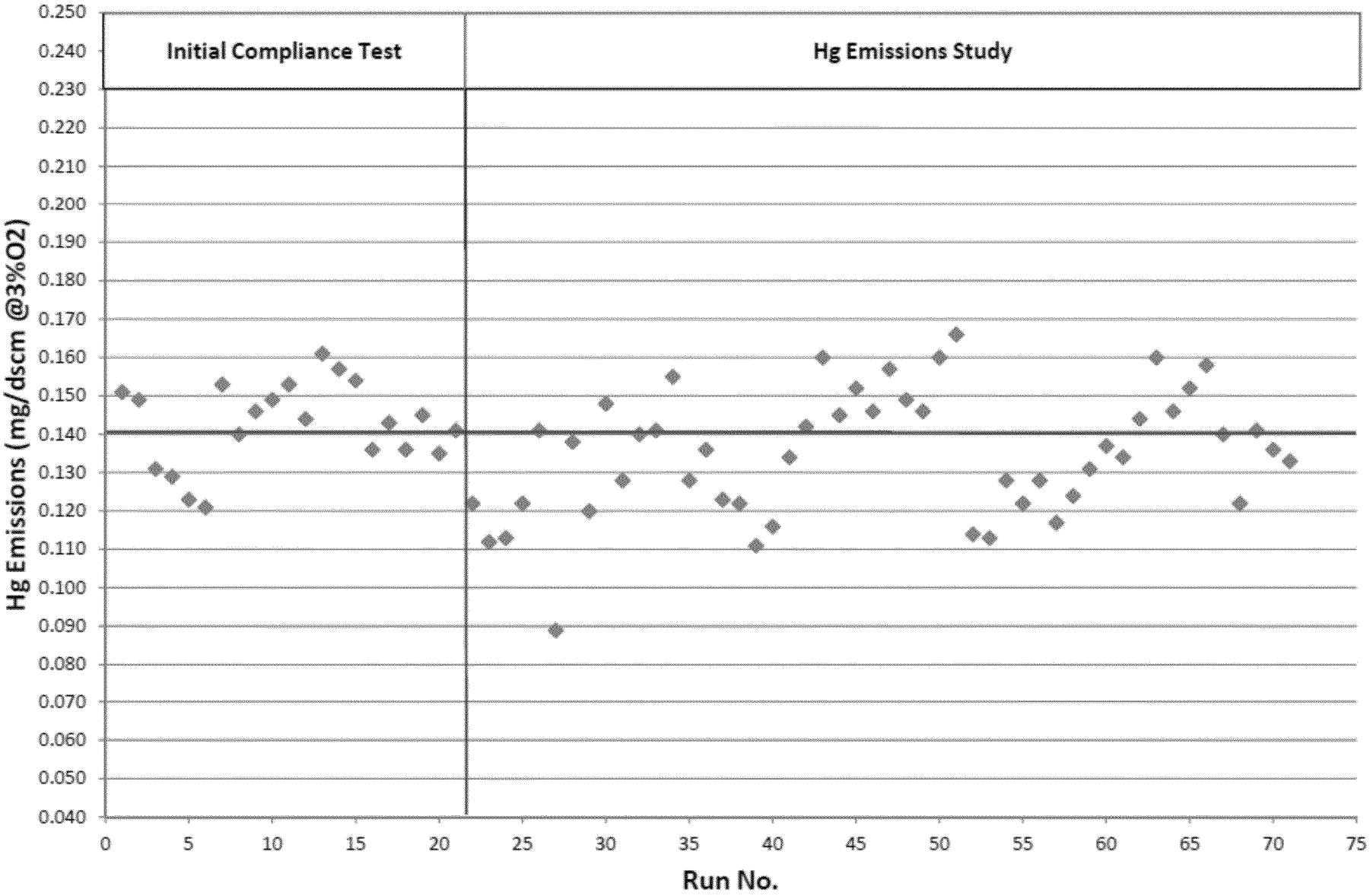
II. ICR & Compliance Test Results



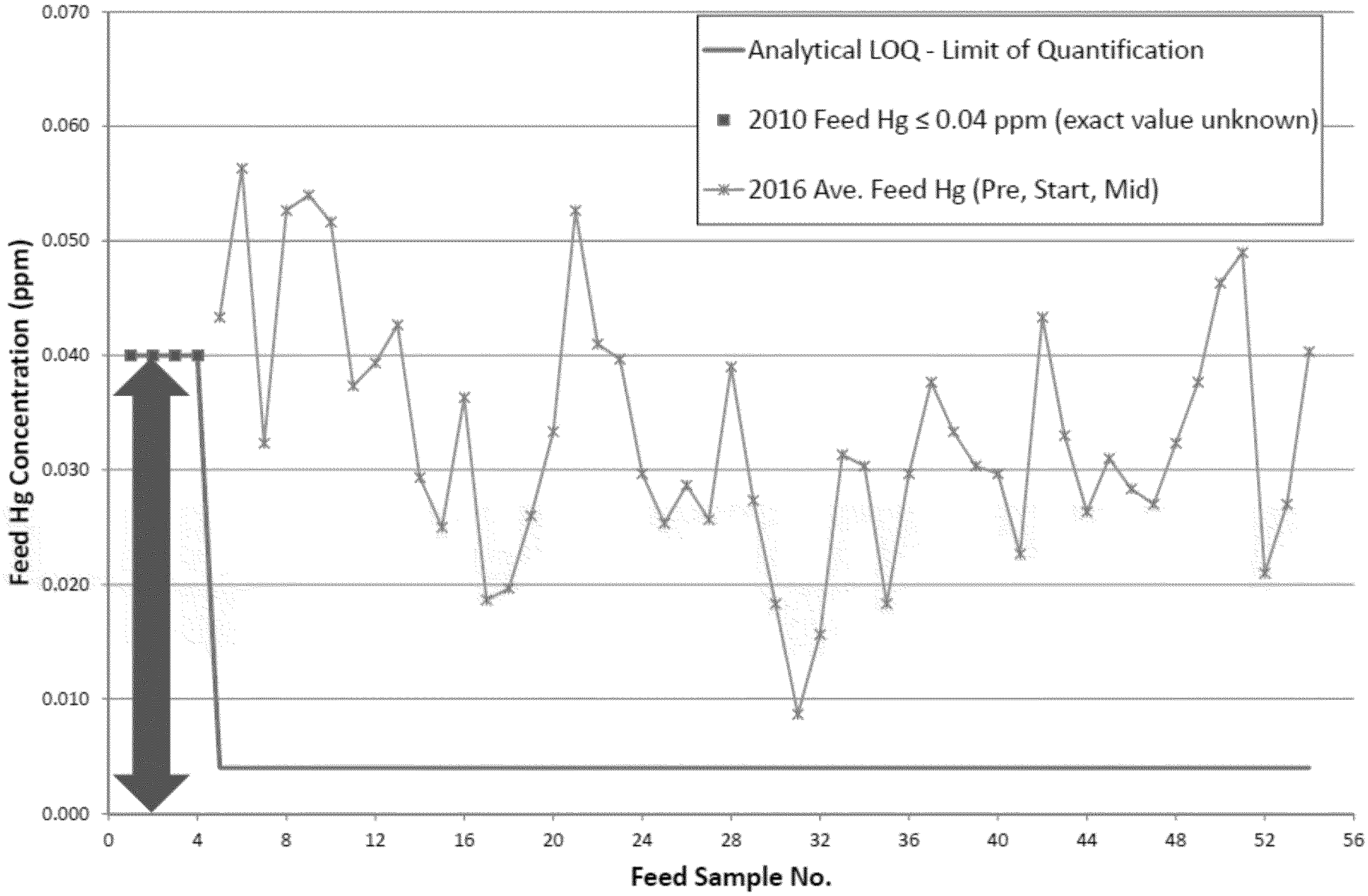
III. PCS Hg Study (2016)

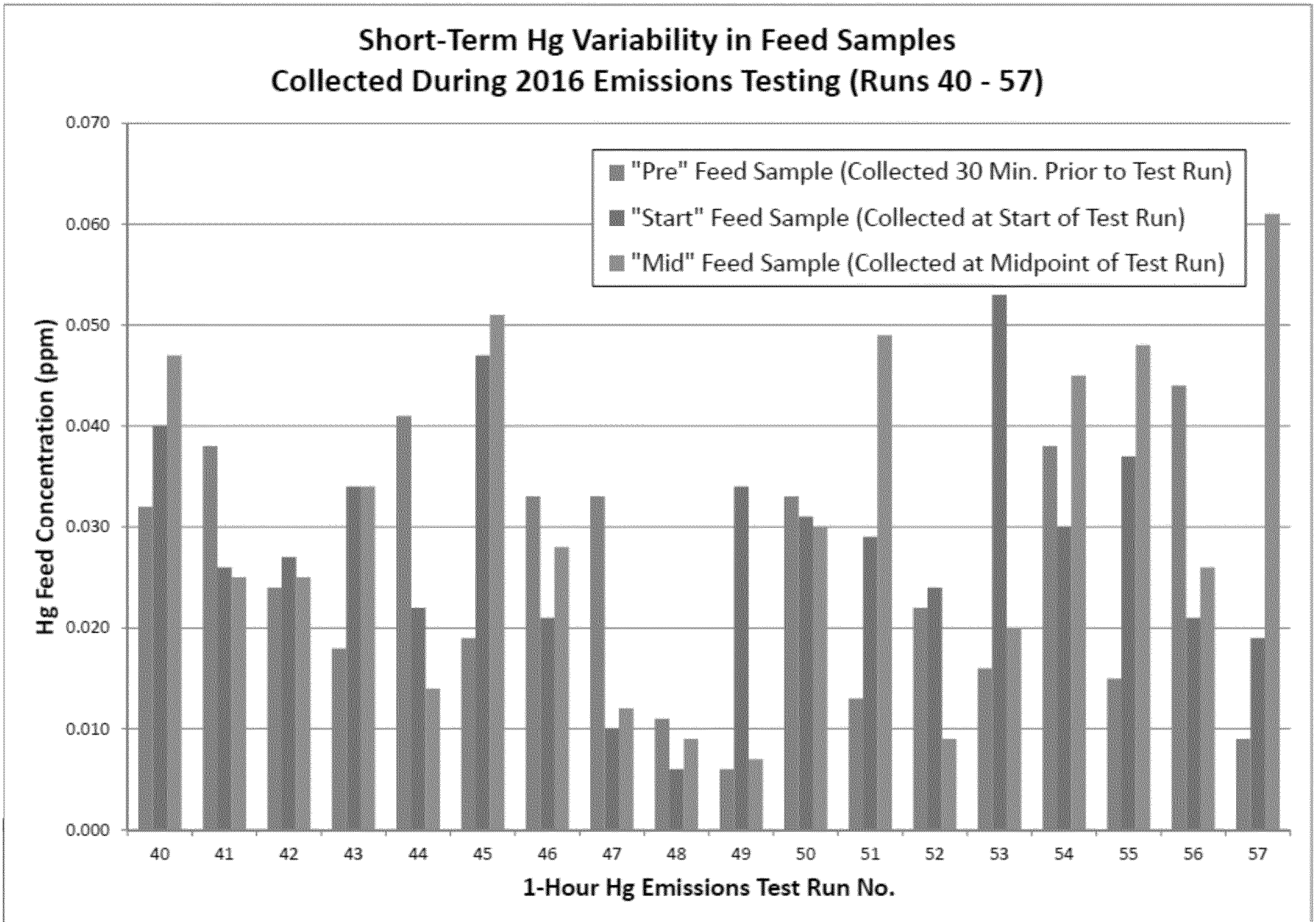
- Objective: Determine whether Hg floor limit is achievable during all representative operating conditions
- Sampling & Analysis:
  - >70 stack samples
  - 21 stack samples for EPA Method compliance test
  - 413 rock samples
- PCS Evaluated:
  A. Hg Emissions
  B. Rock Feed Hg Concentration
  C. WESPs / Venturi Scrubbers

2016 Hg Emissions Test Results

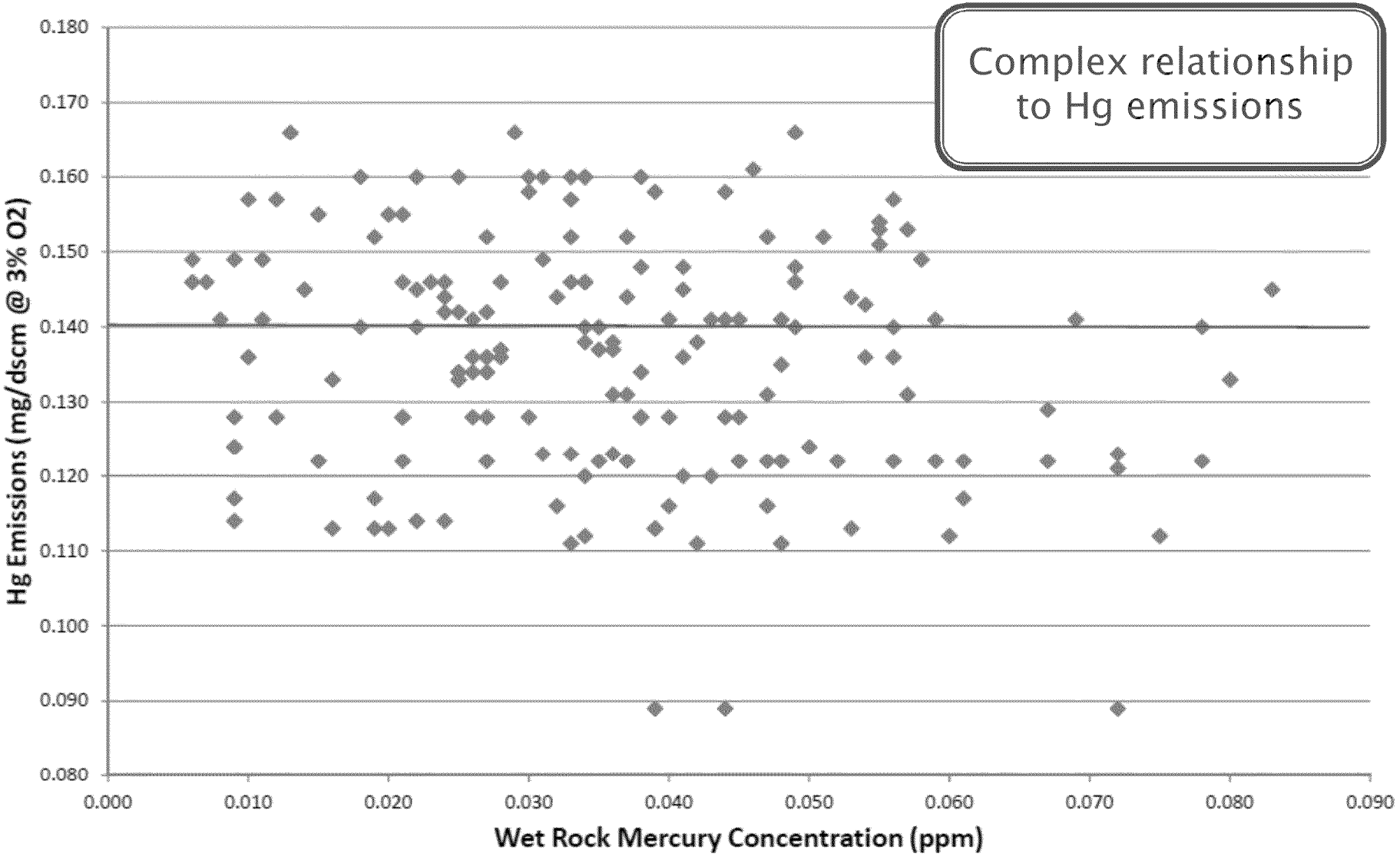


Feed Hg Concentration Data (2010 & 2016)




Short-Term Hg Variability in Feed Samples
Collected During 2016 Emissions Testing (Runs 40 - 57)
"Pre" Feed Sample (Collected 30 Min. Prior to Test Run)
"Start" Feed Sample (Collected at Start of Test Run)
"Mid" Feed Sample (Collected at Midpoint of Test Run)
Hg Feed Concentration (ppm)
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
1-Hour Hg Emissions Test Run No.

2016 Hg Emissions & Wet Rock Feed Hg Concentration



Feed Hg Concentration

- Significant short-term variability in Hg feed concentrations
- Change in Limit of Quantification (LOQ) complicates analysis of historical data
- Relationship to emissions is complex
- PCS has no control over the Hg content of rock feed to the calciners

WESPs / Wet Scrubbers

- Elemental Hg (Hg^0): Predominant species of Hg exiting PCS calciners (98-99% in ICR results)
- EPA Response to Comments: Hg^0 is "the form primarily released by phosphate rock calciners"
- PCS WESPs / Scrubbers: Operating normally during all 2016 emissions testing
- Conclusion: WESPs/Scrubbers do not effectively control Hg^0 emissions to eliminate variability or achieve MACT floor

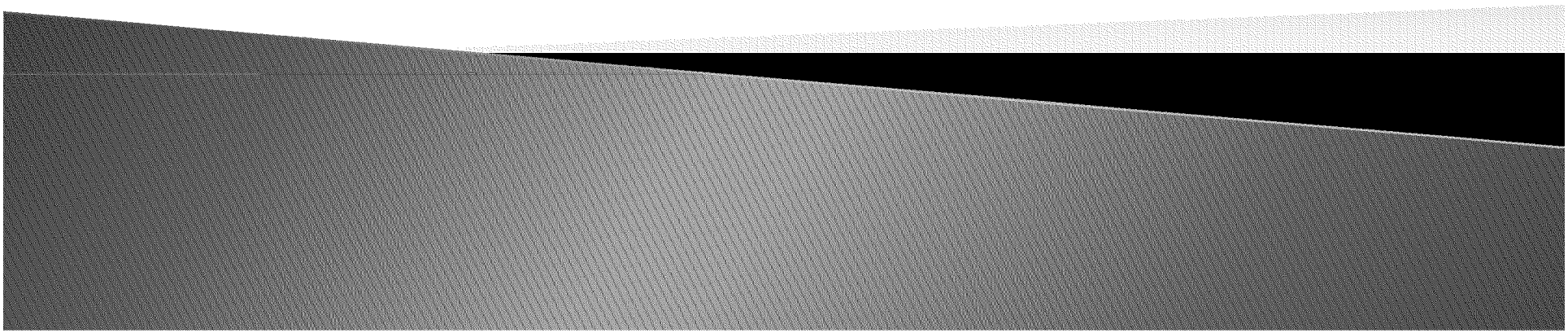
IV. PCS Hg Study Conclusions

* New Hg limit is not achievable during all representative operating conditions and does not meet MACT floor definition
  A. Hg Emissions: Several 2016 test results > 0.14mg/dscm Hg at 3% O_2
  B. Rock Feed Hg Concentration: Significant variability; not within PCS control
  C. WESPs / Venturi Scrubbers: Do not effectively control Hg^0 emissions to achieve MACT floor

Next Steps

* Due to high Hg variability in the ore supply and lack of effective Hg control capability, PCS requests that EPA recalculate the MACT floor and revise Hg limit for existing calciners

Questions?



PCS AMENDED PETITION - ATTACHMENT G

	CALCINER	DATE (2016)	TEST	TIME	FUEL	Hg Emission Rate (mg/dscm@3% O2)	Feed Pre, Mercury PPM	Feed Start, Mercury PPM	Feed Mid, Mercury PPM
1	2	1/30	30B Compliance Test #1	11:00 - 12:00	Coal	0.151			0.055
2	2	1/30	30B Compliance Test #2	12:20 - 13:20	Coal	0.149			0.058
3	2	1/30	30B Colmpliance test #3	14:35 - 15:35	Coal	0.131			0.047
4	5	2/8	30B Compliance Test #1	14:15 - 15:15	Coal	0.129			0.067
5	5	2/8	30B Compliance Test #2	15:30 - 16:30	Coal	0.123			0.072
6	5	2/8	30B Colmpliance test #3	16:41 - 17:41	Coal	0.121			0.072
7	4	2/10	30B Compliance Test #1	12:25 - 13:25	Coal	0.153			0.057
8	4	2/10	30B Compliance Test #2	13:45 - 14:45	Coal	0.140			0.078
9	4	2/10	30B Colmpliance test #3	15:05 - 16:05	Coal	0.146			0.049
10	1	2/11	30B Compliance Test #1	10:25 - 11:25	Coal	0.149			0.031
11	1	2/11	30B Compliance Test #2	12:00 - 13:00	Coal	0.153			0.055
12	1	2/11	30B Colmpliance test #3	13:35 - 14:25	Coal	0.144			0.053
13	3	2/11	30B Compliance Test #1	16:10 - 17:10	Coal	0.161			0.046
14	3	2/11	30B Compliance Test #2	17:45 - 18:45	Coal	0.157			0.056
15	3	2/11	30B Colmpliance test #3	19:05 - 20:05	Coal	0.154			0.055
16	2	2/13	30B Compliance Test #4	10:55 - 11:55	Coal	0.136			0.054
17	2	2/13	30B Compliance Test #5	12:40 - 13:40	Coal	0.143			0.054
18	2	2/13	30B Colmpliance test #6	14:30 - 15:30	Coal	0.136			0.056
19	6	2/19	30B Compliance Test #1	11:30 - 12:30	Coal	0.145			0.083
20	6	2/19	30B Compliance Test #2	12:50 - 13:50	Coal	0.135			0.048
21	6	2/19	30B Colmpliance test #3	14:00 - 15:00	Coal	0.141			0.059
22	6	2/25	Mercury Study Test 1	13:00 - 14:00	Oil	0.122	0.027	0.056	0.047
23	6	2/25	Mercury Study Test 2	16:15 - 17:15	Oil	0.112	0.075	0.060	0.034
24	6	2/26	Mercury Study Test 3	7:20 - 8:20	Oil	0.113	0.019	0.039	0.039
25	6	2/26	Mercury Study Test 4	8:32 - 9:44	Oil	0.122	0.045	0.078	0.035
26	6	2/26	Mercury Study Test 5	10:40 - 11:40	Oil	0.141	0.048	0.069	0.045
27	6	2/26	Mercury Study Test 6	13:10 - 14:24	Oil	0.089	0.044	0.072	0.039
28	6	2/26	Mercury Study Test 7	15:20 - 16:20	Oil	0.138	0.042	0.034	0.036
29	6	2/26	Mercury Study Test 8	16:32 - 17:32	Oil	0.120	0.034	0.041	0.043

30	6	2/29	Mercury Study Test 9	9:00 - 10:00	Oil	0.148	0.041	0.049	0.038
31	6	2/29	Mercury Study Test 10	10:30 - 11:30	Oil	0.128	0.021	0.040	0.027
32	6	2/29	Mercury Study Test 11	12:30 - 13:30	Oil	0.140	0.035	0.022	0.018
33	6	2/29	Mercury Study Test 12	13:35 - 14:55	Oil	0.141	0.040	0.026	0.043
34	6	2/29	Mercury Study Test 13	15:55 - 16:55	Oil	0.155	0.015	0.021	0.020
35	6	2/29	Mercury Study Test 14	17:10 - 18:10	Oil	0.128	0.009	0.012	0.038
36	6	3/1	Mercury Study Test 15	9:30 - 10:30	Oil	0.136	0.010	0.027	0.041
37	6	3/1	Mercury Study Test 16	10:55 - 12:45	Oil	0.123	0.036	0.031	0.033
38	6	3/1	Mercury Study Test 17	13:45 - 14:45	Oil	0.122	0.045	0.061	0.052
39	6	3/1	Mercury Study Test 18	15:10 - 16:10	Oil	0.111	0.048	0.033	0.042
40	6	3/2	Mercury Study Test 19	12:10 - 13:10	Coal	0.116	0.032	0.040	0.047
41	6	3/2	Mercury Study Test 20	13:25 - 14:25	Coal	0.134	0.038	0.026	0.025
42	6	3/2	Mercury Study Test 21	15:35 - 16:35	Coal	0.142	0.024	0.027	0.025
43	6	3/2	Mercury Study Test 22	16:50 - 17:59	Coal	0.160	0.018	0.034	0.034
44	6	3/3	Mercury Study Test 23	8:00 - 9:00	Coal	0.145	0.041	0.022	0.014
45	6	3/3	Mercury Study Test 24	9:15 - 10:15	Coal	0.152	0.019	0.047	0.051
46	6	3/3	Mercury Study Test 25	11:20 - 12:20	Coal	0.146	0.033	0.021	0.028
47	6	3/3	Mercury Study Test 26	12:40 - 13:40	Coal	0.157	0.033	0.010	0.012
48	6	3/3	Mercury Study Test 27	14:40 - 15:38	Coal	0.149	0.011	0.006	0.009
49	6	3/3	Mercury Study Test 28	16:05 - 17:05	Coal	0.146	0.006	0.034	0.007
50	6	3/7	Mercury Study Test 29	12:00 - 13:00	Coal	0.160	0.033	0.031	0.030
51	6	3/7	Mercury Study Test 30	13:15 - 14:15	Coal	0.166	0.013	0.029	0.049
52	6	3/7	Mercury Study Test 31	15:15 - 16:15	Coal	0.114	0.022	0.024	0.009
53	6	3/7	Mercury Study Test 32	16:25 - 17:25	Coal	0.113	0.016	0.053	0.020
54	6	3/8	Mercury Study Test 33	7:45 - 8:45	Coal	0.128	0.038	0.030	0.045
55	6	3/8	Mercury Study Test 34	9:00 - 10:00	Coal	0.122	0.015	0.037	0.048
56	6	3/8	Mercury Study Test 35	10:35 - 12:02	Coal	0.128	0.044	0.021	0.026
57	6	3/8	Mercury Study Test 36	15:15 - 16:15	Coal	0.117	0.009	0.019	0.061
58	6	3/10	Mercury StudyTest 37	12:30 - 14:57	Coal	0.124	0.009	0.050	0.009
59	6	3/10	Mercury Study Test 38	15:10 - 16:10	Coal	0.131	0.057	0.037	0.036
60	6	3/10	Mercury Study Test 39	16:30 - 17:57	Coal	0.137	0.035	0.028	0.036
61	6	3/14	Mercury StudyTest 38	10:05 - 11:05	Coal	0.134	0.027	0.027	0.025
62	6	3/14	Mercury Study Test 40	11:20 - 12:20	Coal	0.144	0.024	0.037	0.032
63	6	3/14	Mercury Study Test 41	13:10 - 14:10	Coal	0.160	0.038	0.025	0.022

64	6	3/14	Mercury StudyTest 39	14:40 - 15:40	Coal	0.146	0.034	0.024	0.023
65	6	3/14	Mercury Study Test 42	15:55 - 16:55	Coal	0.152	0.033	0.027	0.037
66	6	3/16	Mercury Study Test 43	12:15 - 13:15	Coal	0.158	0.039	0.030	0.044
67	6	3/16	Mercury StudyTest 40	14:05 - 15:05	Coal	0.140	0.049	0.056	0.034
68	6	3/24	Mercury Study Test 44	9:35 - 10:35	Coal	0.122	0.021	0.059	0.067
69	6	3/24	Mercury Study Test 45	10:45 - 11:45	Coal	0.141	0.044	0.008	0.011
70	6	3/24	Mercury StudyTest 41	14:45 - 15:45	Coal	0.136	0.028	0.026	0.027
71	6	3/24	Mercury Study Test 46	16:55 - 17:55	Coal	0.133	0.016	0.080	0.025