PCC Structurals, Inc.

December 15, 2021

Kenzie Billings
Oregon Department of Environmental Quality
700 NE Multnomah Street, Suite 600
Portland, Oregon 97232

Re: Response to DEQ letter dated October 19, 2021

Dear Kenzie Billings:

PCC Structurals, Inc. (PCC), received a letter dated October 19, 2021 (the letter), from the Oregon Department of Environmental Quality (DEQ) relating to the Cleaner Air Oregon (CAO) Large Parts Campus Emissions Inventory submitted by PCC on October 10, 2020. PCC and Maul Foster & Alongi, Inc. (MFA), have prepared the following responses, due December 15, 2021, with the exception of responses to items for which an extension request was submitted by PCC to the DEQ on December 1, 2021. PCC also received a letter dated December 14, 2021 responding to the extension request and asking that additional information be included with this letter. Responses to the December 14 letter are included at the end of this letter.

Confidential Business Information

Portions of this letter are entitled to trade secret status because the information herein: (1) cannot be patented, (2) is known only to a limited number of individuals within PCC who make every effort to ensure this information is not available to or obtained by competitors, (3) provides economic value to PCC by being maintained as confidential, and (4) is maintained as confidential by PCC and thereby provides PCC with a business advantage over its competitors. In support of these factors we note that PCC has never shared the CBI with anyone outside of a select group of "need to know" employees and contractors and for many products we are prohibited by our customer from revealing certain aspects of production. Our competitors are always keenly interested in knowing details about our operations. The redacted portions of this letter contain information PCC actively works to keep confidential. If such information was released to the public, competitors could utilize that information to their advantage to steer sales away from PCC and/or to avoid incurring expenses. This information derives independent economic value from not being generally known to the public or to other persons who can obtain economic value from its disclosure or use--the very definition of a trade secret.

We note that the data being redacted are outside the scope of "emissions data." PCC recognizes that the total emissions from the facility are emissions data and would be subject to public

scrutiny. However, the redacted information does not include total emissions data and so should be exempt from disclosure.

If the DEQ determines that any portion of the information for which we are requesting trade secret protection is not immune from a Public Records Act request, we request that you return this letter and the attached materials, in their entirety, to us so that we can find a different means of providing the information you need without endangering our business or causing PCC to be in breach of the representations it has made to its customers, including the U.S. Military.

Response to Questions

This response document is organized in the same manner as the information was requested in the letter. DEQ comments are shown in bold followed by the response.

1. **Baghouse dust analytical data is not sufficient to be considered representative of baghouse emissions. DEQ requires you to perform representative source testing of baghouses by January 31, 2022 to verify assumed control efficiencies.**

PCC is working with the DEQ to develop an agreeable conceptual testing plan. The development of the conceptual testing plan will continue through communications separate from this response.

2. **Narrative descriptions are not sufficient to support numerical assumptions. Please provide the requested data that supports assumptions quoted below by no later than December 15, 2021:**

    a. **Conventional steel contains metals, some of which are reportable TACs, including, but not limited to, chromium, cadmium, lead, zinc, and nickel. Include estimates for reportable TAC emissions from this process, or complete testing to verify assumption that no TACs are emitted from this process: *"Baghouse 6419 – Decontamination sandblast cyclone and cutting station does not process product. Only conventional steel is processed."***

PCC submitted a Notice of Construction application for replacement of Baghouse 6419 which was approved by the DEQ on November 8, 2021. As stated in the Notice of Construction application, the replacement baghouse will have ULPA after-filters. Given the unknown composition of mild steel potentially processed in the future, PCC proposes to analyze the baghouse dust from the decontamination process once it is again operational and then determine the appropriate course of action to classify this source as part of CAO.

b. Provide supporting calculation(s) for DEQ review: *"Emissions from acid etch tanks were made using a pool evaporation calculation."*

The pool evaporation calculation methodology and supporting data were outlined in Table 15 and Table 49 of the Large Parts Campus Emissions Inventory submitted to the DEQ on October 10, 2020. Physical dimensions from the acid etch tanks are used to derive the surface area, and a wind speed over the liquid based on the velocity into the backdraft hood is conservatively assumed to apply to the entire surface area. The partial pressures of the acid are empirically derived from the references listed in the emissions inventory. Please let us know whether any specific clarifications are needed.

c. The percentage of emissions being emitted from specified emission points must be supported by exhaust system design documents, engineering testing, or other supporting data for the following comments:

i. "Dust collection records for baghouse 0585 and baghouse 1807 are combined. All dust is tracked and all emissions are accounted for. The 50% split is based on engineering judgement and exhaust configuration."

Baghouse 0585 (a conventional baghouse) is not currently in service. Dust currently being collected at the existing drop box is representative of Baghouse 1807 only. Initial dust collection data after removal of Baghouse 0585 indicate that Baghouse 1807 was the predominant source of dust sent to the combined drop box. Once sufficient dust data have been collected, PCC will verify the amount of dust collection attributable exclusively to Baghouse 1807, and MFA will revise the PTE emissions inventory accordingly.

Emissions from the shotblasting that were routed to Baghouse 0585 are currently routed to Baghouse 9255, which has HEPA after-filters. The production group that used the shotblaster previously controlled by Baghouse 9255 now operates at the Large Parts Campus LSBS locations.

ii. "Please refer to the updated emission inventory submitted September 3, 2020 for air casting calculations. Percentage of emissions routed to the baghouse is based on operator observation and engineering judgement based on the exhaust configuration."

Please see the additional justification for the proposed air casting collection efficiency included in Attachment A.

iii. *"PTE annual production is based on the facility projections from historical production activities. Please refer to the updated emissions*

inventory submitted September 3, 2020 for air casting calculations. Baghouse filter specifications were submitted to DEQ on June 15, 2020." **Please provide the requested information to support the percentage of emissions assumed to be emitted from specified emission points.**

Please see the additional justification for the proposed air casting collection efficiency included in Attachment A.

iv. "The building contains minimal venting aside from venting to the baghouses. 75% of welding emissions routed to the baghouses is based on observation of process, and the most likely airflow is through baghouses."

Please see the additional justification for the proposed LSBS II welding collection efficiency included as Attachment B.

v. "The furnace uses two types of vacuum pumps. The dry pumps vent to a baghouse, the other pumps vent to atmosphere. Emissions are assumed to be split evenly among the two pump types."

Large vacuum casting furnaces, such as VMM1, operate with multiple vacuum pumps, each maintaining the vacuum on different chambers in the furnace. The chambers include the following:

- The primary chamber
- The mold chamber
- The charge or ingot chamber

Melting and pouring activities occur in the primary chamber. The primary chamber is held at a maximum vacuum of [redacted], for the duration of the casting process to minimize the presence of oxygen in the furnace. Oxygen can lead to oxidation of the metal in the furnace, producing unacceptable flaws in the casting. Interlocks between both the primary chamber and mold chamber and the primary chamber and charge chamber allow the pressure of the primary chamber to be maintained.

Charge metal is loaded into the primary chamber, which is then sealed and pumped down to the necessary vacuum before initiating melting by electric induction. If needed, additional charge metal is placed in the charge chamber with the interlock to the primary chamber closed. The charge chamber door is then sealed, and the charge chamber pressure is lowered to the necessary vacuum. The interlock to the primary chamber is opened, and the metal is lowered into the primary chamber. The interlock is closed to seal the primary chamber, and the additional metal is added to the charge. When the charge is ready, preheated molds are placed

in the mold chamber with the interlock to the primary loading chamber closed. The mold chamber is then sealed and pumped down to the necessary vacuum, at which point the interlock is opened, and the mold is moved into the primary chamber for casting by the furnace. The interlock to the primary chamber is again closed, then the door to the mold chamber is opened to allow a heated tundish (through which the molten metal will be poured) to be placed into the mold chamber. The mold chamber is again pumped down to the necessary vacuum, the interlock to the primary chamber opened, and the tundish is moved into place by the furnace. The interlock is again closed, sealing the primary chamber. The metal is then poured through the tundish into the molds, producing cast ingots. At no point during the casting process is the primary chamber open to ambient conditions.

The airflow moved by a given vacuum pump is equivalent to the volume of the furnace chamber being pumped down to vacuum. Once the required vacuum is achieved, the amount of air removed from the chamber to maintain the vacuum is negligible. For VMM1, two types of vacuum pumps are used: a steam ejector and dry pumps.

VMM1's steam ejector draws the initial vacuum on the primary chamber before any emission-producing activities are initiated and maintains operational vacuum for the duration of the casting process. Therefore, negligible emissions are vented through the steam ejector. The steam used to supply the vacuum is passed through a condensing system as part of normal operations. Steam that is not condensed and recirculated through the system (e.g., residual steam) is vented to atmosphere.

VMM1's dry pumps operate on the mold chamber and charge chamber, both of which cycle between ambient and operational vacuum conditions as components are added to and removed from the primary chamber. As a result, these vacuum pumps will move more air than the steam ejector. Any residual emissions that exist in the primary chamber are more likely to be drawn into the mold chamber or charge chamber when the interlock is opened after casting.

It is not feasible to determine the exact breakdown of emissions routing through the two types of vacuum pumps; though it is unlikely that a significant amount of emissions are vented by the steam ejector. Even if emissions were vented by the steam ejector, they would pass through the condenser system, which would likely remove emissions from the exhaust stream. For these reasons, we believe a 50/50 split of emissions between the steam ejector and dry pump is a conservative assumption. Emissions are most likely released by the dry pump systems, which are routed to a baghouse with ULPA filtration.

vi. "The estimated emissions represent commingled emissions within the building envelope. Emissions are estimated for the TEU's in the emissions inventory, so estimating 1% of emissions from TEUs with

baghouses as being commingled emissions within the building is a conservative estimate."

MFA recognizes that the 1 percent commingled emissions is a carryover from the development of the facility Air Contaminant Discharge Permit and was intended to add conservatism to the emissions inventory. Commingled emissions are not attributable to any specific emission point and can be removed from the inventory.

d. Emissions estimates made on a percentage of usage basis must be accompanied by supporting data or engineering testing for the following comments:

i. *"Vacuum processes will result in minimal oxidation of elemental metals due to the lack of oxygen in the process. Oxidation is considered an impurity to the final product, and the facility works to mitigate oxidation as much as possible. The percentage of elemental metals oxidized in vacuum processes is assumed to be 3%."*

PCC had discussions with a metallurgist who indicated that there should be no oxidation of metal in vacuum processes. To avoid absolutes, a value of 3 percent was conservatively assigned to represent the potential for some oxygen to be present in the vacuum processes. As an example, PCC specifies a maximum allowable pressure within the casting furnaces of less than [redacted]. Ambient pressure is approximately 760,000 microns (760 mm Hg). A pressure (vacuum) of [redacted] represents approximately 99.99 percent vacuum (with 0 percent representing ambient conditions).

MFA attempted to identify methods to directly analyze the breakdown between elemental metal and metal compounds (e.g., oxides) in vacuum process emissions. Methods to discriminate between elemental metals and metal compounds are indirect and reliant on multiple assumptions about the makeup of the samples as part of the data analysis. PCC and MFA discussed this type of testing with an analyst at the RJ Lee Group, who indicated that potential indirect analyses would include X-ray diffraction, possibly in combination with scanning electron microscopy. X-ray diffraction can provide an analysis of the crystalline structures in a given sample (i.e., particulate), but it would not provide a direct quantitative determination of material composition. For heterogenous samples, such as particulate emissions from PCC, the X-ray diffraction analysis would need to be performed in combination with imaging using a scanning electron microscope (SEM). Manual review of the SEM images may distinguish elemental metal from other compounds on the surface of the small sample analyzed, but SEM cannot determine the specific material composition. As this evaluation is conducted on individual particles, not on the bulk sample as with typical analytical chemistry techniques, the results of the analysis are best suited for homogeneous samples of known

constituency. Therefore, the uncertainty for such an analysis of samples collected from PCC would be unreasonably high and could not be considered as representative.

ii. *"**HCl is used to modulate the pH of the slurry to ensure the slurry has the correct consistency for shell building. The acid is not a volatile constituent (such as an alcohol), and is not intended to flash off, but reacts after it is added into the slurry. Therefore, emissions were conservatively assumed to be 5% of usage."***

As stated previously, hydrochloric acid (HCl) is integral to maintaining the consistency and homogeneity of the slurry by modulating the pH of the mixture. HCl also serves as a catalyst in the hydrolysis reaction that generates the silica gel needed to effectively bind ceramic powders and is generally integrated within the resulting gel structure. For these reasons, the HCl is not expected to volatilize at any significant rate, and estimating emissions at 5 percent of usage is conservative. When slurry pots have reached the end of their useful life, the slurry, which still contains HCl, is disposed of. The emissions inventory does not account for the slurry disposal rate.

iii. ***"Hot Top is the "molten metal insulation" applied after casting. The purpose of the hot top is to melt and create an insulative layer on openings in the mold after casting by way of a thermite reaction. Some smoke is generated by the instantaneous reaction, and it is conservatively estimated that this smoke represents 1% of the total mass of hot top used."***

On December 1, 2021, PCC submitted an extension request to allow additional time to complete bench-scale testing of the loss of hot top material on ignition. Hot top is a thermite mixture that reacts violently on ignition, so great care is being taken to ensure testing is done in a safe manner that can produce adequate results.

3. **Requested information must be provided for DEQ review. In-person, onsite review is not sufficient for DEQ approval. Please provide the following information regarding alloys and Safety Data Sheets claimed to be Confidential Business Information by December 15, 2021.**

On December 1, 2021, PCC submitted an extension request to the DEQ to allow additional time for document review and approval by PCC management for the following requested information:

a. **Alloy composition data, including specific alloy content(s)**

b. **Autoclave & Wax Reclaim engineering testing data/bench scale test report(s)**

c. Wax Safety Data Sheet(s)

d. Acid Etch Line Safety Data Sheet(s)

e. Welding rod, wire, etc. Safety Data Sheet(s)

f. Titanium alloy composition data, including specific alloy content(s)

Response to December 14 Letter

In the December 14 Letter, the DEQ granted the extension requested on December 1, 2021 with the following conditions:

1. PCC Structurals must provide a progress report on December 15, 2021 detailing:

a. Which means to justify the percentage loss on ignition resulting from the application of hot top during the casting processes are being considered, including proposed testing method(s),

PCC is developing a bench-scale testing method to verify the loss-on-ignition using gravimetric analysis. Designing a bench-scale test to capture such small changes in mass has proven difficult. PCC is working to improve the resolution of the testing and will require additional time to analyze results after performing successful test runs.

b. What information on SDSs is considered confidential, and an update on which methods of providing the confidential business information are being considered.

PCC is in the process of ensuring the requested information is thoroughly reviewed by appropriate PCC management. The information being considered as confidential has never been released to the public, and it is of critical business importance to both PCC and their customers that this information remains confidential. Therefore, PCC anticipates providing redacted copies of all documents containing confidential information. Where possible, unredacted copies of these documents will be provided to the DEQ and the unredacted versions of all other documents will be made available to the DEQ for review onsite at PCC, or at a meeting with the DEQ where PCC keeps possession of all copies of the documents at the end of the meeting.

Please let us know if you have any additional questions. We will continue developing responses to the remaining items.

We also request that the DEQ update PCC's mailing address on file to ensure future communications are promptly received. The updated mailing address is:

5001 SE Johnson Creek Blvd, Milwaukie, OR 97222

Sincerely,

PCC Structurals, Inc.

Attachments: LPCS Air Casting Emissions Memo
LSBS II Welding Emissions Memo

cc: Bryan McCampbell
Tom Wood (Stoel Rives)
Brian Eagle (MFA)