- EST. 1914 -
NEWMAN
& COMPANY, INC

December 15, 2022

Maryjoy Ulatowski
City Of Philadelphia
Air Management Services
321 S University Ave
Philadelphia, PA 19104

Re: Notification of RACT III Applicability [25 Pa. Code §129.115(a)] and Alternative RACT Compliance Analysis [25 Pa. Code §129.114(i)]
Title V Operating Permit No. V15-003 / Plan Approval No. IP16-000223
Newman & Company, Inc. – Philadelphia, PA

Dear Ms. Ulatowski:

Newman & Company, Inc. (Newman) is providing this summary of Reasonably Available Control Technology (RACT) applicability and compliance plans for its paperboard manufacturing facility located in Philadelphia, Pennsylvania (Facility) in accordance with the recently promulgated provisions of 25 Pa. Code §§129.111-129.115 (RACT III). This document represents the required notification of applicability and compliance proposal under 25 Pa. Code §129.115(a).

In addition, this document includes the analysis of alternative RACT III compliance required under 25 Pa. Code §129.114(i) for those sources at the Facility subject to alternative RACT III determinations and alternative RACT III determinations that were previously approved by Air Management Services (AMS) and the Pennsylvania Department of Environmental Protection (PADEP) under 25 Pa. Code §129.99 (RACT II).

Facility Background

The Facility manufacturers paperboard, with the products being used for items such as paper boxes, game boards, puzzles, book covers, and tablets. The Facility operates pursuant to AMS Title V Operating Permit (TVOP) No. V15-003 (Permit). On March 31, 2020, the Facility received approval from AMS for its 25 Pa. Code §129.99 (RACT II) proposal in the form of Plan Approval No. IP16-000223 (Plan Approval).

The Union Cogeneration Boiler (Source ID 001) is currently permitted to burn both natural gas and No. 6 fuel oil. The Ferman Warehouse Fire Pump (Source ID 036) is currently permitted to burn No. 2 fuel oil. AMS has mandated that all facilities, including Newman, cease utilization of No. 6 fuel oil for combustion purposes (Philadelphia AMR §3-207). At the direction of AMS,

in November 2020 Newman submitted a Request for Determination (RFD) for authorization to temporarily combust No. 2 fuel oil or ultra-low sulfur diesel (ULSD) in Source ID 001 as a replacement for No. 6 fuel oil. In September 2021, the Facility submitted an Installation Permit Application (Application) to revise the Permit and replace No. 6 fuel oil with No. 2 fuel oil or ULSD as an allowable fuel for Source ID 001. Newman permanently depleted the remaining No. 6 fuel oil stored onsite in the Spring of 2020 and replaced the boiler's fuel oil supply with No. 2 fuel oil. No physical changes were required for Source ID 001 to begin operating using either No. 2 fuel oil or ULSD as an alternative fuel. As of the date of this submission, the Application is under review by AMS.

In addition to this initial notification, Newman has prepared an amendment to revise the proposed permit conditions and alternative RACT II proposal for Source ID 001 provided in the Application in order to adopt the applicable provisions of RACT III. This amendment has been prepared based on direction from Mr. Ed Weiner at AMS and is being submitted in lieu of a significant operating permit modification in accordance with 25 Pa. Code §129.114(f) because the Application serves as the official permitting mechanism to modify the Permit. Newman has submitted this amendment separately via the AMS Citizenserve Online Portal.

RACT III Rule Applicability

On November 12, 2022, the PADEP published 25 Pa. Code §§129.111-129.115, "Additional RACT Requirements for Major Sources of NOx and VOCs for the 2015 Ozone NAAQS" also known as the RACT III Rule. The RACT III requirements or emissions limitations supersede the requirements or emissions limitations of a RACT permit previously issued in accordance with 25 Pa. Code §§129.91-129.95 and 129.96-129.100, except in cases where an existing RACT permit specifies more stringent requirements and/or emissions limitations. Compliance with applicable RACT III Rule requirements or emissions limitations must be demonstrated no later than January 1, 2023.

The RACT III Rule applies to major nitrogen oxides (NOx) and/or major volatile organic compound (VOC) emitting facilities. 25 Pa. Code §121.1 defines major NOx and VOC emitting facilities as follows:

- Major NOx emitting facility – a facility with the potential to emit (PTE) greater than 100 tons per year (TPY).
- Major VOC emitting facility – a facility with the PTE greater than 50 TPY.

The facility-wide PTE VOC is less than 50 TPY. Therefore, the Facility is not subject to the VOC provisions of RACT III. The facility-wide PTE NOx is greater than 100 TPY. Therefore, Newman is a major NOx emitting facility subject to the NOx provisions of RACT III per 25 Pa. Code §129.111(a). This submittal is being made in accordance with the requirements of the RACT III Rule for the Facility's NOx emitting sources only.

25 Pa. Code §129.115(a) – Notification of Applicability and Compliance Proposal

The following subsections provide the notification of applicability and compliance proposal required under 25 Pa. Code §129.115(a).

25 Pa. Code §129.115(a)(1) – Submission Deadline

Because the Facility was a major NOx emitting facility prior to August 3, 2018, this submittal is being made on or before December 31, 2022 per 25 Pa. Code §129.115(a)(1)(i).

25 Pa. Code §129.115(a)(2) – Identification of Air Contamination Sources That Commenced Operation on or Before August 3, 2018

Table A-1 of Attachment A presents a RACT III Rule Applicability Summary, which identifies the following:

- Air contamination sources subject to a presumptive RACT requirement or RACT emissions limitation pursuant to 25 Pa. Code §129.112.
- Air contamination sources subject to an alternative RACT requirement or RACT emissions limitation pursuant to 25 Pa. Code §129.114.

25 Pa. Code §129.115(a)(3) – Identification of Air Contamination Sources That Commenced Operation After August 3, 2018

Not Applicable (N/A) – the Facility was a major NOx emitting facility prior to August 3, 2018, and there are no air contamination sources that commenced operation after August 3, 2018.

25 Pa. Code §129.115(a)(4) – Identification of Air Contamination Sources That Emit Less Than 1 TPY

Table A-2 of Attachment A presents the air contamination sources that emit less than one ton per year (TPY) of NOx and are thus not required to be evaluated under the RACT III Rule pursuant to 25 Pa. Code §129.111(c).

25 Pa. Code §129.115(a)(5) – Air Contamination Source Information (Commenced Operation on or Before August 3, 2018)

Table A-3 of Attachment A presents a source inventory that includes a description, make, model, and location (as available) of each air contamination source subject to the RACT III Rule. The applicable RACT requirement or RACT emissions limitation for each source is provided in the RACT III Rule Applicability Summary as Table A-1 of Attachment A.

Newman has determined that two sources (i.e., Source ID 001 and Source ID 036) are subject to the RACT III requirements. All other NOx emissions sources are exempt from RACT III requirements.

Newman has identified Source ID 001 as the only source that requires an alternative RACT III determination and proposed alternative RACT III compliance demonstration for control of NOx emissions because it cannot meet the applicable presumptive requirements in 25 Pa. Code §129.112. Newman has determined that the alternative RACT II requirements and/or RACT II emissions limitations that were previously approved by AMS under 25 Pa. Code §129.99(e) continue to represent RACT for Source ID 001.

Additionally, Newman has re-evaluated the alternative RACT II determinations for the firing of No. 6 fuel oil approved by AMS in the Plan Approval under 25 Pa. Code §129.99(e) for Source ID 001 due the change in fuel to No. 2 fuel oil or ULSD mandated by AMS. An analysis is provided to certify that the RACT requirements and/or RACT emissions limitations for the firing of No. 2 fuel oil or ULSD that are proposed in the Application represent RACT for Source ID 001.

Newman proposes to comply with the RACT III Rule by complying with the proposed RACT conditions provided later in this document. Newman will meet the January 1, 2023 compliance deadline of the RACT III Rule through compliance with these proposed conditions. The proposed RACT-specific conditions of the Application are provided in Table A-4 of Attachment A.

25 Pa. Code §129.115(a)(6) – Air Contamination Source Information (Commenced Operation After August 3, 2018)

N/A – 25 Pa. Code §129.115(a)(3) does not apply.

25 Pa. Code §129.115(a)(7) – Air Contamination Source Information (Sources That Emit Less Than 1 TPY)

Table A-5 of Attachment A provides a source inventory that includes a description, make, model, and location (as available) of each air contamination source that emits less than one ton per year (TPY) of NOx and is not required to be evaluated under the RACT III Rule pursuant of 25 Pa. Code §129.111(c). Table A-6 of Attachment A provides a summary of the potential emissions calculations for each of the air contamination sources included this source inventory.

25 Pa. Code §129.115(b) – Demonstration of Compliance by Monitoring or Testing Procedures

N/A – 25 Pa. Code §129.115(b)(1) through (b)(5) are not applicable because the Facility does not maintain a continuous emissions monitoring system (CEMS) for Source ID 001 or 036 for sources subject to a NOx RACT III requirement or NOx RACT III emissions limitation pursuant to 25 Pa. Code §129.112.

N/A – 25 Pa. Code §129.115 (b)(6) is not applicable to Source ID 001. Source ID 001 does not require testing to demonstrate compliance with a new emission limitation; as set forth herein, this source is subject to a NOx RACT III requirement or RACT III emission limitation under §129.112(g) that it cannot meet. Accordingly, Newman proposed herein an alternative RACT requirement under the provisions of 25 Pa. Code §129.114(a). Newman proposes to comply with the proposed alternative RACT requirements provided in the Application by continuing to conduct source testing for Source ID 001 according to the schedule set forth in the Permit.

25 Pa. Code §129.115(b)(6) is not applicable to Source ID 036 because this source is only subject to work practice standards under 25 Pa. Code §129.112(c) and there are no applicable emissions limitations that require testing to demonstrate compliance for Source ID 036.

25 Pa. Code §129.114(i) – Analysis of Alternative RACT Compliance

Newman has identified Source ID 001 as the only source that requires an alternative RACT evaluation and proposed alternative RACT compliance demonstration for control of NOx emissions because it cannot meet the applicable presumptive requirements in 25 Pa. Code §129.112.

In accordance with 25 Pa. Code §129.114(i), an alternative RACT proposal, as required under 25 Pa. Code §129.114(d), is not necessary if the source in question was in operation prior to October 24, 2016, has not been modified or changed since October 24, 2016, and does not fall into one of the presumptive source categories subject to 25 Pa. Code §§129.112(c)(11) or (i)-(k).

Source ID 001 meets each of these criteria when firing natural gas. This submission serves as a demonstration that Newman can maintain compliance with the alternative RACT requirements and/or emissions limitations for the firing of natural gas previously approved and established as RACT by AMS in the Plan Approval.

The following subsections provide the analysis of alternative RACT III compliance under 25 Pa. Code §129.114(i)(1)(i). Newman has determined that there are no new pollutant-specific air cleaning devices, air pollution control technologies or techniques available at the time of submittal of this analysis for the control of NOx emissions that were not available at the time of the RACT II submittal. Additionally, Newman has determined that each technically feasible air cleaning device, air pollution control technology or technique approved under 25 Pa. Code §129.99(e) had a cost effectiveness greater than $7,500 per ton of NOx emissions reduced when firing of natural gas. There were no alternative RACT II requirements approved for Newman under 25 Pa. Code §129.99(e) that were below the economic feasibility benchmark value and therefore, 25 Pa. Code §129.114(i)(1)(ii) does not apply.

As noted above, Newman was required by Philadelphia AMR §3-207 to cease operation of No. 6 fuel oil in Source ID 001, and No. 6 fuel oil has been replaced with No. 2 fuel oil as an alternative to burning natural gas. Under the RACT III rule, a distillate oil-fired combustion unit with a rated heat input equal to or greater than 50 MMBtu/hr is subject to a NOx emission limit

of 0.12 lb NOx/MMBtu. Because No. 6 fuel and No. 2 or ULSD are subject to different presumptive RACT limits under RACT II and RACT III, cost analyses previously submitted in support of Newman's RACT II demonstration under 25 Pa. Code §129.114(i)(1)(i) are not applicable to the firing No. 2 or ULSD fuel in the boiler. Accordingly, new control cost analyses were developed for RACT III for each technically feasible air cleaning device to account for the combustion of No. 2 fuel oil or ULSD.

This submission also serves as a demonstration that Newman can comply with the alternative RACT requirements and/or emissions limitations proposed as RACT for the firing of No. 2 fuel oil or ULSD in the Application as outlined in the "Alternative RACT Compliance Summary" section below.

25 Pa. Code §129.114(i)(1)(i)(A) – Identification of New Air Cleaning Devices, Air Pollution Control Technologies, or Techniques

Newman conducted a search for air cleaning devices, air pollution control technologies, and other techniques that could be applied to the boiler using the RACT/Best Available Control Technology (BACT)/Lowest Achievable Emissions Rate (LAER) Clearinghouse (RBLC). The search results were compared against the search results utilized for the RACT II analysis to identify anything that is new since the previous RACT II evaluation. No new air cleaning devices, air pollution control technologies, or techniques were discovered for either the firing of natural gas or No. 2 fuel oil or ULSD and the current emissions controls for the RACT III affected units are consistent with recent and historical BACT determinations.

25 Pa. Code §129.114(i)(1)(i)(B) – List Previously-Identified Technically Feasible Controls

The previous RACT II evaluation determined that Selective Catalytic Reduction (SCR) is the most effect NOx control technology for Source ID 001. The RACT II evaluation demonstrated that LNB and FGR were both technically and economically infeasible. Table 1 summarizes the cost information previously examined for Source ID 001 that were included in Newman's 25 Pa. Code §129.99(d) RACT II submittal to AMS. Refer to the section below titled "Alternative RACT Determinations – Technical Infeasibility" for further information.

Table 1
Cost Summary for SCR Control Technology
Evaluated Under 25 Pa. Code §§129.92(b)(1)-(3)

Source ID	Name	Pollutant	Control Technology Option	Fuel Type	Cost per ton of Pollutant Removed
001	Union Cogeneration Boiler	NOx	SCR	Natural Gas	$11,154 (corrected)

25 Pa. Code §129.114(i)(1)(i)(C) – Summary of Previous Economic Feasibility Analyses

Newman performed an updated analysis to determine the economic feasibility of SCR control technology. The initial economic evaluation was submitted previously under 25 Pa. Code §129.99(d) and conducted in accordance with the "EPA Air Pollution Control Cost Manual" (Sixth Edition) EPA/452/B-02-0001, January 2002, as amended.

An updated version of the economic feasibility analysis submitted under 25 Pa. Code §129.99(d) for the use of SCR when firing of natural gas has been provided in Attachment B to reflect a correction to the original cost analysis. A minor error related to the number of catalyst layers included in the SCR design was discovered in the previously submitted economic feasibility analysis for natural gas and has been corrected in this submittal. This minor error does not change the overall feasibility conclusion.

A separate economic feasibility analysis for the use of SCR when firing of No. 2 fuel oil or ULSD has been provided in Attachment C.

25 Pa. Code §129.114(i)(1)(i)(D) – Statement of Economic Infeasibility

Upon review of the initial economic evaluations, it was determined that the cost effectiveness remains equal to or greater than $7,500 per ton of NOx emissions reduced for the use of SCR control technology for boiler when firing natural gas, provided in Table 1. The economic feasibility analyses for these control technologies when firing natural gas are provided in Attachment B.

25 Pa. Code §129.114(a) – New Cost Analysis Economic Infeasibility

Because the boiler (Source 001) is subject to a new presumptive RACT III NOx emission limit while now burning No. 2 distillate fuel oil or ULSD, compared to RACT II when it was burning No. 6 residual fuel oil, a new alternative RACT III emission limitation is being proposed as per 25 Pa. Code §129.114(a) and (d). New control cost analyses were developed for RACT III for each technically feasible air cleaning device to account for the combustion of No. 2 fuel oil or ULSD, as seen in Table 2.

Table 2
New Cost Summary for SCR Control Technology

Source ID	Name	Pollutant	Control Technology Option	Fuel Type	Cost per ton of Pollutant Removed
001	Union Cogeneration Boiler	NOx	SCR	No. 2 Distillate Fuel Oil	$31,710

Upon review, it was determined that the cost of $31,710 per ton of NOx emissions reduced with the use of SCR control technology for the boiler when firing No. 2 or ULSD is economically infeasible. The economic feasibility analyses for these control technologies when firing No. 2 Fuel Oil or ULSD are provided in Attachment C.

25 Pa. Code §129.114(i)(1)(i)(e) – Additional Information

Upon request from AMS and/or PADEP, Newman will provide additional information to support the Alternative RACT Compliance Analysis included herein.

Alternative RACT Compliance Summary

Plan Approval No. IP16-000223 contains source-specific emissions limitations; source testing requirements; and monitoring, recordkeeping, and reporting requirements that were established to comply with RACT II when Source ID 001 was permitted to fire No. 6 fuel oil. For the purposes of this submission, the Facility assumes that the provisions of RACT III to which Source ID 001 is subject will apply to the firing of both natural gas and No. 2 fuel oil or ULSD. Newman proposes to comply with the established NOx emissions limit of 0.37 lb/MMBtu when firing natural gas. Newman also proposes to comply with the proposed NOx emissions limit of 0.18 lb/MMBtu when firing No. 2 fuel oil or ULSD provided in the Application. Newman proposes to comply with the proposed alternative RACT requirement by continuing to conduct source testing for Source ID 001 according to the schedule set forth in the Permit.

Table A-4 of Attachment A presents the proposed conditions with which Source ID 001 will comply in greater detail.

Alternative RACT Determinations – Technical Infeasibility

As part of the RACT II determination, Newman investigated potential front-end control options for reducing NOx emissions from Source ID 001. Newman determined that no technically feasible front-end control technology exists primarily because there are physical limitations to the boiler that prevent the use of low NOx burners (LNB), ultra-low NOx burners (ULNB), or flue gas recirculation (FGR) for the firing of both natural gas and No. 2 fuel oil or ULSD for Source ID 001.

For LNB and ULNB specifically, the physical design of the Facility building would require moving the burner back three feet into the operating floor. This alteration would require the addition of a tunnel which poses structural challenges regarding supporting a roof in a high temperature zone. The tunnel would also concentrate the initial heat release, defeating the purpose of the LNB or ULNB as the projected emissions reduction does not account for the effects of the unusual tunnel alteration. LNB or ULNB staged combustion will also reduce flame stability and therefore increase the likelihood of flame failure trips which will result in needing to shut down and restart Source ID 001. These technical challenges were originally presented in detail in Attachment H of Newman's 2016 RACT II submittal.

The addition of an FGR unit will pose similar technical problems as a result of lowering the flame stability. The FGR unit will also increase convective heat transfer to the super heater, and the increased temperatures may exceed the metal ratings of the super heater, requiring extensive alterations. These alterations will further complicate operations and may increase the likelihood of interruption to Facility operations. Additional engineering justification related to the infeasibility of LNB/ULNB and FGR is supplied by Powerhouse Operations Inc. in Attachment D.

Newman certifies that no new NOx control technologies exist that would be technically feasible for Source ID 001. Based on the technical and economic feasibility of the control technologies evaluated, Newman proposes NOx RACT to be the use of good operating practices (i.e., maintaining optimum combustion efficiency, implementing appropriate maintenance procedures, optimizing the air-fuel ratio, etc.) and compliance with the established NOx emissions limit for the firing of natural gas and with the proposed NOx emissions limit for the firing of No. 2 fuel oil or ULSD provided in the Application.

Certification of Alternative RACT Compliance Analysis

I certify under penalty of law that, based on information and belief formed after reasonable inquiry, the statements and information contained in this 25 Pa. Code §129.114(i) Alternative RACT Compliance Analysis are true, accurate, and complete.

Signature: _____ Date: 12/15/2022

Name: Michael Ferman Title: CEO.

RACT III Rule Recordkeeping

In accordance with 25 Pa. Code §129.115(f), Newman will keep sufficient records for demonstrating compliance with the RACT III Rule, including continued compliance with the RACT-specific recordkeeping conditions of Plan Approval No. IP16-000223, and the VOC exemption documentation provided per 25 Pa. Code §129.115(h). Also, per 25 Pa. Code §129.115(k), all records will be maintained for at least five years and will be made available to AMS and PADEP upon receipt of a written request.

In accordance with 25 Pa. Code §129.115(a), Newman is submitting this letter to AMS no later than December 31, 2022. Please contact me at (215) 333-8700 or via email at Michael.Ferman@newmanpaperboard.com if you have any questions related to this submittal.

Sincerely,
Newman & Company, Inc.

Michael Ferman
Chief Executive Officer

cc: Brent Shick (ALL4)
Bob Kuklentz (ALL4)

Attachment A – RACT III Applicability Summary
Attachment B – Revised RACT II Economic Feasibility Analysis for Natural Gas
Attachment C – RACT III Economic Feasibility Analysis for No. 2 Fuel Oil or ULSD
Attachment D – Technical Feasibility Letter

ATTACHMENT A -
RACT III APPLICABILITY SUMMARY

Table A-1

Comparison of PADEP RACT II (25 Pa. Code §§ 129.96-129.100) and RACT III (25 Pa. Code §§ 129.111-129.115) - Subject Sources

Newman & Company, Inc. - Philadelphia, PA

Source ID	Source Name/Description	NO_X RACT II	RACT II Citation	NO_X RACT III	RACT III Citation
001	Union Cogeneration Boiler	Case-by-case: RACT analysis required because source exceeds presumptive RACT II limits established in § 129.97(g)(1)(i-ii) of 0.10 lb/MMBtu when firing natural gas and 0.12 when firing distillate fuel oil.	§ 129.99(b)	Case-by-case: RACT analysis required because source exceeds presumptive RACT III limits established in § 129.112(g)(1)(i-ii) of 0.10 lb/MMBtu when firing natural gas and 0.12 when firing distillate fuel oil.	§ 129.114(b)
036	Ferman Warehouse Fire Pump	Presumptive: Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices.	§129.96(c)	Presumptive: Maintain and operate the source in accordance with the manufacturer's specifications and with good operating practices.	§129.112 (c) (10)

Table A-2

Comparison of PADEP RACT II (25 Pa. Code §§ 129.96-129.100) and RACT III (25 Pa. Code §§ 129.111-129.115) - Exempt Sources

Newman & Company, Inc. - Philadelphia, PA

Source ID	Source Name/Description	NO_x RACT II	RACT II Citation	NO_x RACT III	RACT III Citation
026	Building No. 6 Space Heater 1	Exempt - PTE less than 1 tpy	§129.96(c)	Exempt - PTE less than 1 tpy	§ 129.111(c)
027	Building No. 6 Space Heater 2				
028	Building No. 6 Space Heater 3				
029	Building No. 6 Space Heater 4				
030	Building No. 6 Space Heater 5				
031	Building No. 6 Space Heater 6				
041	Warehouse Sprinkler No. 1 Space Heater				
042	Warehouse Sprinkler No. 2 Space Heater				
043	Warehouse Sprinkler No. 3 Space Heater				
003	Truck Shop Space Heater				
004	Truck Shop Space Heater				
005	Truck Shop Space Heater				
006	Truck Shop Space Heater				
007	Office Heater				
008	Shop Space Heater				
009	Powerhouse Space Heater				
010	Garage Space Heater				
011	Garage Space Heater				
012	Office Water Heater				
013	Mill Water Heater				
014	Mill Water Heater				
015	Power Washer - Shop				
016	Power Washer - Powerhouse				
017	USC Building Space Heater 1				
018	USC Building Space Heater 2				
019	USC Building Space Heater 3				
020	USC Building Space Heater 4				
022	Skid Shop Space Heater 1				
023	Skid Shop Space Heater 2				
024	Skid Shop Space Heater 3				
025	Truck Shop Water Heater				
032	Building No. 6 Furnace				
033	USC Building Space Heater 5				
034	USC Building Boiler 1				
038	USC Building Space Heater 6				
039	USC Building Space Heater 7				
040	USC Building Space Heater 8				
037	Vapor Recovery System for FML5				
FML5	3,000 Gallon Gasoline UST				
CD1	Trim Waste Blower System				

Table A-3

Facility-Wide Emissions Description For Sources Subject to RACT III (25 Pa. Code §§ 129.111-129.115)

Newman & Company, Inc. - Philadelphia, PA

Source ID	Source Name/Description	Capacity	Location
001	Union Cogeneration Boiler	118 MMBtu/hr	Powerhouse
036	Ferman Warehouse Fire Pump	973,000 Btu/hr	Ferman Warehouse

Table A-4
Summary of Proposed Permit Conditions - Source ID 001
Newman & Company, Inc. - Philadelphia, PA

Source ID	Source Name	Emissions Limitations	Testing Requirement	Monitoring, Recordkeeping, and Reporting Requirements
001	Union Cogeneration Boiler	1. Emission Limitations a) ID# 001 – Union Cogeneration Boiler (3) Nitrogen Oxides (NO_X) emissions from the boiler shall not exceed ~~0.430~~ 0.18 lbs/MMBtu when firing ~~#6~~ #2 oil or ULSD [25 Pa. Code §127.12(a)(5)] and 0.37 lbs/MMbtu when firing natural gas ~~[Case-by-case RACT Plan Approval effective June 11, 1998, 25 Pa Code §§129.91-129.95]~~ [Case-by-case RACT II Plan Approval 16-000223 effective March 31, 2020, 25 Pa Code §§129.96-129.100] (5) NO_X emissions from the boiler shall not exceed 0.20 lb/MMBtu when firing ~~#6~~ #2 oil or ULSD and 0.10 lb/MMBtu when firing natural gas during the period of May 1 to September 30 ("ozone season") each year. If these limits are exceeded, NO_X allowance(s) may be purchased to demonstrate compliance [25 Pa Code §129.201]	No Proposed Changes.	4. Monitoring Requirements a) ID# 001 – Union Cogeneration Boiler (3) Daily No. ~~6~~ 2 oil usage for the boiler and manifests documenting the sulfur and nitrogen content for fuel oil burned. 5. Recordkeeping Requirements a) ID# 001 – Union Cogeneration Boiler (2) Daily No. ~~6~~ 2 oil or ULSD usage for the boiler and manifests documenting the sulfur and nitrogen content for fuel oil burned.

Table A-5

Facility-Wide Emissions Description For Sources Not Required to Be Evaluated Under RACT III (25 Pa. Code §§ 129.111-129.115)

Newman & Company, Inc. - Philadelphia, PA

Source ID	Source Name/Description	Capacity	Location
026	Building No. 6 Space Heater 1	400,000 Btu/hr	Building No. 6
027	Building No. 6 Space Heater 2		
028	Building No. 6 Space Heater 3		
029	Building No. 6 Space Heater 4		
030	Building No. 6 Space Heater 5		
031	Building No. 6 Space Heater 6		
041	Warehouse Sprinkler No. 1 Space Heater	400,000 Btu/hr	Warehouse
042	Warehouse Sprinkler No. 2 Space Heater		
043	Warehouse Sprinkler No. 3 Space Heater		
003	Truck Shop Space Heater	< 250,000 Btu/hr	Truck Shop
004	Truck Shop Space Heater		
005	Truck Shop Space Heater		
006	Truck Shop Space Heater		
007	Office Heater	< 250,000 Btu/hr	Office
008	Shop Space Heater		Shop
009	Powerhouse Space Heater		Powerhouse
010	Garage Space Heater	< 250,000 Btu/hr	Garage
011	Garage Space Heater		
012	Office Water Heater	< 250,000 Btu/hr	Office
013	Mill Water Heater	< 250,000 Btu/hr	Mill
014	Mill Water Heater		
015	Power Washer - Shop	< 250,000 Btu/hr	Shop
016	Power Washer - Powerhouse	< 250,000 Btu/hr	Powerhouse
017	USC Building Space Heater 1	< 250,000 Btu/hr	USC Building
018	USC Building Space Heater 2		
019	USC Building Space Heater 3		
020	USC Building Space Heater 4		
022	Skid Shop Space Heater 1	< 250,000 Btu/hr	Skid Shop
023	Skid Shop Space Heater 2	< 250,000 Btu/hr	
024	Skid Shop Space Heater 3	< 250,000 Btu/hr	
025	Truck Shop Water Heater	< 250,000 Btu/hr	Truck Shop
032	Building No. 6 Furnace	< 250,000 Btu/hr	Building No. 6
033	USC Building Space Heater 5	< 250,000 Btu/hr	USC Building
034	USC Building Boiler 1		
038	USC Building Space Heater 6		
039	USC Building Space Heater 7		
040	USC Building Space Heater 8		
037	Vapor Recovery System for FML5	N/A	N/A
FML5	3,000 Gallon Gasoline UST	3,000 gallon	N/A
CD1	Trim Waste Blower System	N/A	Mill

Table A-6

Potential Emissions Calculations For Sources Not Required to Be Evaluated Under RACT III (25 Pa. Code §§ 129.111-129.115)

Newman & Company, Inc. - Philadelphia, PA

Source ID	Source Name/Description	Capacity		Fuel(s)	Emissions Factor [a] (lb/MMscf)	Unit	Potential Emissions Rate (tpy)
026	Building No. 6 Space Heater 1	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
027	Building No. 6 Space Heater 2	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
028	Building No. 6 Space Heater 3	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
029	Building No. 6 Space Heater 4	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
030	Building No. 6 Space Heater 5	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
031	Building No. 6 Space Heater 6	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
041	Warehouse Sprinkler No. 1 Space Heater	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
042	Warehouse Sprinkler No. 2 Space Heater	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
043	Warehouse Sprinkler No. 3 Space Heater	400,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1718
003	Truck Shop Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
004	Truck Shop Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
005	Truck Shop Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
006	Truck Shop Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
007	Office Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
008	Shop Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
009	Powerhouse Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
010	Garage Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
011	Garage Space Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
012	Office Water Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
013	Mill Water Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
014	Mill Water Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
015	Power Washer - Shop	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
016	Power Washer - Powerhouse	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
017	USC Building Space Heater 1	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
018	USC Building Space Heater 2	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
019	USC Building Space Heater 3	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
020	USC Building Space Heater 4	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
022	Skid Shop Space Heater 1	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
023	Skid Shop Space Heater 2	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
024	Skid Shop Space Heater 3	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
025	Truck Shop Water Heater	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
032	Building No. 6 Furnace	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
033	USC Building Space Heater 5	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
034	USC Building Boiler 1	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
038	USC Building Space Heater 6	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
039	USC Building Space Heater 7	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
040	USC Building Space Heater 8	250,000	Btu/hr	Natural Gas	100	lb/MMSCF	0.1074
037	Vapor Recovery System for FML5	N/A	N/A	N/A	N/A	N/A	N/A
FML5	3,000 Gallon Gasoline UST	3,000	gallon	N/A	N/A	N/A	N/A
CD1	Trim Waste Blower System	N/A	N/A	N/A	N/A	N/A	N/A

[a] Emissions factors for natural gas combustion and the natural gas higher heating value are from U.S. EPA's AP-42 Chapter 1.4, Table 1.4-1.

Conversions	
8,760	hours/year
1,020	Btu/scf [a]
1,000,000	Btu/MMBtu
2,000	lb/ton

ATTACHMENT B -
REVISED RACT II ECONOMIC FEASIBILITY ANALYSIS
FOR NATURAL GAS

Table B-1

Capital and Annualized Costs for Operation of Selective Catalytic Reduction

Boiler 1 (Source ID 001) Firing Natural Gas

Newman and Company, Inc. - Philadelphia, PA

CAPITAL COSTS

COST ITEM	FACTOR		COST ($)
Direct Capital Costs [a]			
Purchased Equipment Costs			
SCR System, including catalyst [b]		A	$595,000
Instrumentation	0.10 A		$59,500
Freight	0.05 A		$29,750
Total Purchased Equipment Cost		B	**$684,250**
Direct Installation Costs [c]			
Foundations and Supports	0.12 B		$82,110
Handling and Erection	0.40 B		$273,700
Electrical	0.01 B		$6,843
Piping	0.05 B		$34,213
Insulation for Ductwork	0.07 B		$47,898
Painting	0.02 B		$13,685
Total Direct Installation Cost			**$458,448**
Total Direct Capital Cost		DC	***$1,142,698***
Indirect Capital Costs [a]			
Indirect Installation Costs			
General Facilities	0.05 DC		$57,135
Engineering and Home Office Fees	0.10 DC		$114,270
Process Contingency	0.05 DC		$57,135
Total Indirect Installation Cost		IC	**$228,540**
Project Contingency	0.15 (DC+IC)		$205,686
Total Plant Cost	DC+IC+ Proj. Cont.		$1,576,923
Preproduction Cost	0.02 (Total Plant Cost)		$31,538
Inventory Capital [d]	$Vol_{reagent}$ * $Cost_{reagent}$		$226
Total Capital Investment (TCI)			***$1,608,687***

ANNUALIZED COSTS

COST ITEM	FACTOR	UNIT COST	ANNUAL COST ($)
Direct Annual Costs [a]			
Operating Materials			
Aqueous Ammonia Reagent [e]	73,758 gallons/yr	$0.08 per gallon	$5,901
Catalyst Replacement [f, g]			$60,666
Reheat Exhaust [h]			$693,391
Renting and Operating Temporary Boiler [i]			$6,700
Lost Electric Generation [i]			$21,495
Maintenance			
Maintenance Labor and Materials	1.5% of TCI		$24,130
Utilities			
Electricity [j, k]	34 kilowatts	$0.069 per kWh	$20,775
Total Direct Annual Costs		***DAC***	***$833,057***
Indirect Annual Costs [a]			
Capital Recovery	0.0944 CRF x TCI		$151,849
Expected Lifetime of Equipment:	*20 years*		
at	*7% interest*		
Total Indirect Annual Costs		***IDAC***	***$151,849***
Total Annualized Costs			***$984,906***

Cost Effectiveness ($/ton)			
Control Efficiency [l]:	73%		
Uncontrolled Emissions Rate [m]:	121.00 tons NO_X/yr @ 0.37 lb/MMBtu	***Annual Cost/Ton NO_X Removed:***	***$11,154***
Potential Controlled Emissions:	88.30 tons NO_X/yr @ 0.10 lb/MMBtu		

Table B-1

Capital and Annualized Costs for Operation of Selective Catalytic Reduction

Boiler 1 (Source ID 001) Firing Natural Gas

Newman and Company, Inc. - Philadelphia, PA

(a) Direct and indirect capital and annualized costs were estimated based on the U.S. EPA Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual, Sixth Edition (January 2002), Section 1, Chapter 2 and Section 4.2, Chapter 2.

(b) Cost information is representative of SCR equipment and associated aqueous ammonia storage tank and tank components (piping, valves, etc.). Cost information for SCR was obtained from Cleaver-Brooks on May 27, 2016, and cost information for the tank was obtained from Airgas on October 4, 2016. The estimated cost of SCR is $395,000 and the estimated cost of the tank is $200,000.

(c) Direct installation costs calculated using installation factors evaluated for similar control methods, as presented in the U.S. EPA OAQPS Air Pollution Control Manual, 6th Edition, January 2002.

(d) Inventory capital is based on the reagent storage tank capacity, calculated based on equations 2.32 through 2.35 in Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual, Sixth Edition, and the vendor-specific reagent price for a 19% aqueous ammonia solution. 19% aqueous ammonia was chosen as the reagent to avoid the applicable requirements of a Risk Management Plan.

Reagent Storage Tank Capacity	2,829 gallons
Price of Ammonia Reagent	$0.08 per gallon

(e) Annual reagent consumption based on the expected 19% aqueous ammonia solution consumption rate, calculated based on equations 2.32 through 2.34 in Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual, Sixth Edition.

Expected Reagent Consumption	8.42 gallons/hr
Operating Schedule	8,760 hrs/yr

(f) Catalyst replacement cost calculated based on equations 2.50 through 2.53 in Section 4.2, Chapter 2, Section 2.4.1 of the U.S. EPA OAQPS Control Cost Manual, Sixth Addition. The catalyst volume was sized using guidance from Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual, Sixth Addition. The following factors were used in the calculation:

Catalyst Volume	476 ft^3
No. of SCR Reactors	1
Catalyst Lifetime	24,000 hours
Interest Rate	7%

(g) Catalyst cost is from the U.S. EPA Air Pollution Control Technology Fact Sheet for Selective Catalytic Reduction, Document No. EPA-452/F-03-032, July 2003. Cost has been adjusted to reflect estimated cost in 2016.

Catalyst Cost	$370 per ft^3

(h) To achieve stack conditions such that the SCR will be capable of operating, the stack exhaust flow must be reheated. The cost associated with this reheat is based upon engineering judgement.

(i) The cost to rent and operate a temporary boiler for 3 months, as well as the lost electric generation during this time, has been estimated by Powerhouse Operations, Inc. to be approximately $563,900. This cost has been accounted for over the expected lifetime of the SCR.

(j) Electrical requirement was calculated based on equation 2.48 in Section 4.2, Chapter 2, Section 2.4.1 of the U.S. EPA OAQPS Control Cost Manual. The calculation is based on the boiler heat input and uncontrolled NO_X emissions rate, as listed in Newman's current TVOP No. V15-003. for Source ID 001. The number of catalyst layers was determined using guidance from Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual. The following factors were used in the calculation:

Boiler Heat Input	118.0 MMBtu/hr
Uncontrolled NO_X Emissions Rate	0.37 lb/MMBtu
Ductwork Pressure Drop	2 in. H_2O
No. of Catalyst Layers	4
Catalyst Pressure Drop	1 in. H_2O per layer

(k) Price of electricity (industrial) is April 2016 data for Pennsylvania: https://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a

(l) Control efficiency based on vendor estimation that the SCR system will achieve an emissions rate of 15 ppmv when firing natural gas.

(m) Uncontrolled potential NO_X emissions rate based on Condition No. 4 of Section D of Newman's current TVOP No. V15-003.

ATTACHMENT C -
RACT III ECONOMIC FEASIBILITY ANALYSIS
FOR NO. 2 FUEL OIL OR ULSD

Table C-1

Capital and Annualized Costs for Operation of Selective Catalytic Reduction

Boiler 1 (Source ID 001) Firing No. 2 Fuel Oil or ULSD

Newman and Company, Inc. - Philadelphia, PA

CAPITAL COSTS

COST ITEM	FACTOR		COST ($)
Direct Capital Costs [a]			
Purchased Equipment Costs			
SCR System, including catalyst [b]		A	$595,000
Instrumentation	0.10 A		$59,500
Freight	0.05 A		$29,750
Total Purchased Equipment Cost		B	$684,250
Direct Installation Costs [c]			
Foundations and Supports	0.12 B		$82,110
Handling and Erection	0.40 B		$273,700
Electrical	0.01 B		$6,843
Piping	0.05 B		$34,213
Insulation for Ductwork	0.07 B		$47,898
Painting	0.02 B		$13,685
Total Direct Installation Cost			$458,448
Total Direct Capital Cost		DC	***$1,142,698***
Indirect Capital Costs [a]			
Indirect Installation Costs			
General Facilities	0.05 DC		$57,135
Engineering and Home Office Fees	0.10 DC		$114,270
Process Contingency	0.05 DC		$57,135
Total Indirect Installation Cost		IC	$228,540
Project Contingency	0.15 (DC+IC)		$205,686
Total Plant Cost	DC+IC+ Proj. Cont.		$1,576,923
Preproduction Cost	0.02 (Total Plant Cost)		$31,538
Inventory Capital [d]	$Vol_{reagent}$ * $Cost_{reagent}$		$226
Total Capital Investment (TCI)			***$1,608,687***

ANNUALIZED COSTS

COST ITEM	FACTOR	UNIT COST	ANNUAL COST ($)
Direct Annual Costs [a]			
Operating Materials			
Aqueous Ammonia Reagent [e]	73,758 gallons/yr	$0.08 per gallon	$5,901
Catalyst Replacement [f, g]			$60,666
Reheat Exhaust [h]			$693,391
Renting and Operating Temporary Boiler [i]			$6,700
Lost Electric Generation [i]			$21,495
Maintenance			
Maintenance Labor and Materials	1.5% of TCI		$24,130
Utilities			
Electricity [j, k]	32 kilowatts	$0.069 per kWh	$19,200
Total Direct Annual Costs		***DAC***	***$831,482***
Indirect Annual Costs [a]			
Capital Recovery	0.0944 CRF x TCI		$151,849
Expected Lifetime of Equipment:	*20 years*		
at	*7% interest*		
Total Indirect Annual Costs		***IDAC***	***$151,849***
Total Annualized Costs			***$983,331***

Cost Effectiveness ($/ton)		
Control Efficiency [l]:	33%	
Uncontrolled Emissions Rate [m]:	93.03 tons NO_x/yr @ 0.18 lb/MMBtu	***Annual Cost/Ton NO_x Removed:*** ***$31,710***
Potential Controlled Emissions:	31.01 tons NO_x/yr @ 0.12 lb/MMBtu	

Table C-1

Capital and Annualized Costs for Operation of Selective Catalytic Reduction

Boiler 1 (Source ID 001) Firing No. 2 Fuel Oil or ULSD

Newman and Company, Inc. - Philadelphia, PA

(a) Direct and indirect capital and annualized costs were estimated based on the U.S. EPA Office of Air Quality Planning and Standards (OAQPS) Control Cost Manual, Sixth Edition (January 2002), Section 1, Chapter 2 and Section 4.2, Chapter 2.

(b) Cost information is representative of SCR equipment and associated aqueous ammonia storage tank and tank components (piping, valves, etc.). Cost information for SCR was obtained from Cleaver-Brooks on May 27, 2016, and cost information for the tank was obtained from Airgas on October 4, 2016. The estimated cost of SCR is $395,000 and the estimated cost of the tank is $200,000.

(c) Direct installation costs calculated using installation factors evaluated for similar control methods, as presented in the U.S. EPA OAQPS Air Pollution Control Manual, 6th Edition, January 2002.

(d) Inventory capital is based on the reagent storage tank capacity, calculated based on equations 2.32 through 2.35 in Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual, Sixth Edition, and the vendor-specific reagent price for a 19% aqueous ammonia solution. 19% aqueous ammonia was chosen as the reagent to avoid the applicable requirements of a Risk Management Plan.

Reagent Storage Tank Capacity	2,829 gallons
Price of Ammonia Reagent	$0.08 per gallon

(e) Annual reagent consumption based on the expected 19% aqueous ammonia solution consumption rate, calculated based on equations 2.32 through 2.34 in Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual, Sixth Edition.

Expected Reagent Consumption	8.42 gallons/hr
Operating Schedule	8,760 hrs/yr

(f) Catalyst replacement cost calculated based on equations 2.50 through 2.53 in Section 4.2, Chapter 2, Section 2.4.1 of the U.S. EPA OAQPS Control Cost Manual, Sixth Addition. The catalyst volume was sized using guidance from Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual, Sixth Addition. The following factors were used in the calculation:

Catalyst Volume	476 ft^3
No. of SCR Reactors	1
Catalyst Lifetime	24,000 hours
Interest Rate	7%

(g) Catalyst cost is from the U.S. EPA Air Pollution Control Technology Fact Sheet for Selective Catalytic Reduction, Document No. EPA-452/F-03-032, July 2003. Cost has been adjusted to reflect estimated cost in 2016.

Catalyst Cost	$370 per ft^3

(h) To achieve stack conditions such that the SCR will be capable of operating, the stack exhaust flow must be reheated. The cost associated with this reheat is based upon engineering judgement.

(i) The cost to rent and operate a temporary boiler for 3 months, as well as the lost electric generation during this time, has been estimated by Powerhouse Operations, Inc. to be approximately $563,900. This cost has been accounted for over the expected lifetime of the SCR.

(j) Electrical requirement was calculated based on equation 2.48 in Section 4.2, Chapter 2, Section 2.4.1 of the U.S. EPA OAQPS Control Cost Manual. The calculation is based on the boiler heat input and uncontrolled NO_X emissions rate, as listed in Newman's current TVOP No. V15-003. for Source ID 001. The number of catalyst layers was determined using guidance from Section 4.2, Chapter 2, Section 2.3 of the U.S. EPA OAQPS Control Cost Manual. The following factors were used in the calculation:

Boiler Heat Input	118.0 MMBtu/hr
Uncontrolled NO_X Emissions Rate	0.18 lb/MMBtu
Ductwork Pressure Drop	2 in. H_2O
No. of Catalyst Layers	4
Catalyst Pressure Drop	1 in. H_2O per layer

(k) Price of electricity (industrial) is April 2016 data for Pennsylvania: https://www.eia.gov/electricity/monthly/epm_table_grapher.cfm?t=epmt_5_6_a

(l) Control efficiency based on vendor estimation that the SCR system will achieve an emissions rate of 18 ppmv when firing No. 2 fuel oil.

(m) Uncontrolled potential NO_X emissions rate based on Condition No. 4 of Section D of Newman's current TVOP No. V15-003.

ATTACHMENT D -
POWERHOUSE OPERATIONS INC.LETTER

poi controls

Powerhouse Operations Inc.
168 Kings Gate Drive
Lititz, PA 17543
Phone (717) 519-0687
Email: tom@poicontrols.com

October 19, 2022

Mr. Michael Ferman
Newman & Company, Inc.
6101 Tacony Street
Philadelphia, PA 19135

RACT II / III Analysis
Newman & Company, Inc.

Dear Mr. Ferman:

POWERHOUSE has reviewed the RACT II Analysis for the 001 Union Boiler at the Newman & Company, Inc., facility located at 6101 Tacony Street, Philadelphia, PA 19135. An Alternative RACT Compliance Proposal was submitted to Philadelphia Air Management Services on October 20, 2016. Additional comments and responses were provided following requests for additional information in 2019.

The Alternative Compliance Proposal reviewed several NOx reduction practices commonly employed to reduce NOx in Water Tube boilers. The Analysis of NOx reduction technologies as performed for the RACT II Analysis of the 001 Union Boiler are the same valid technologies that would be reviewed in the RACT III analysis of the boiler.

NOx Reduction Analysis for Natural Gas combustion

The 2016 RACT II Analysis reviewed the following technologies which are currently employed in Water Tube boilers to reduce NOx emissions for natural gas combustion:

1. Install new Low NOx Burners
2. Install Flue Gas Recirculation
3. Install new Low NOx Burners and Flue Gas Recirculation

Additional technologies were reviewed in the 2014 RACT Analysis report and included replacing the Air Preheater with a Feedwater Economizer which was found to be technically infeasible with the current boiler configuration and superheated steam use.

The technical questions and concerns with the implementation of these technologies on this field erected boiler continue to be concerns with these technologies. The furnace box, which was originally designed for a coal stocker boiler, continues to be too short Low NOx burner technologies. The short furnace plus a lack of water tubes in the furnace box would require significant modifications to the boiler front and considerable downtime to conduct these modifications. Additional modifications including changes to the Forced Draft Fan and Induced Draft Fan systems would also require upgrades to handle changes to the boiler configuration. All of these concerns are outlined in the RACT II Analysis already presented.

POWERHOUSE has reviewed the above options as presented in the 2014 RACT Analysis and the 2015 RACT II Analysis and confirms that there is no change in the assessment in the implementation of these industry recognized NOx reduction technologies. The economic feasibility of these technologies would reflect inflationary trends in the economic climate conditions.

Please feel free to contact me if you have any questions.

Sincerely,

Thompson McConnell, CAP, CEM