REGIONAL HAZE FOUR-FACTOR REASONABLE PROGRESS ANALYSIS

DCP Operating Co.
Chitwood Gas Plant

Prepared By:

Kyle Dunn, PE – Managing Consultant
Jeremy Jewell – Principal Consultant

TRINITY CONSULTANTS
5801 E. 41st St.
Suite 450
Tulsa, OK 74135
(918) 622-7111

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TABLE OF CONTENTS

LIST OF TABLES

1. INTRODUCTION

Trinity Consultants (Trinity) prepared this report on behalf of DCP Operating Co. (DCP) in response to the July 1, 2020 "Notification of request for 4-factor analysis on control scenarios under the Clean Air Act Regional Haze Program" (the July 1, 2020 request) from the Oklahoma Department of Environmental Quality (the ODEQ) to DCP's Chitwood Gas Plant (Chitwood). ODEQ requested that DCP perform a four-factor analysis of all potential control measures for NO_X on all fuel-burning equipment with a heat input of 50 million British thermal units per hour (MMBTU/hr) or more. There is no equipment at Chitwood that exceeds this threshold, but ODEQ also explicitly requested an analysis for nine natural gas-fired engines (Units C-1 to C-9). DCP is authorized to operate these engines under the authority of ODEQ Part 70 Operating Permit No. 2016-1248-TVR3 ("the permit").

The engine types and horsepower ratings for each affected unit are as follows:

- C-1, C-2, C-3, and C-4: 880-hp (7.3 MMBTU/hr) Cooper-Bessemer GMV-8 two-stroke lean-burn (2SLB)
- C-5: 880-hp (7.3 MMBTU/hr) Clark HRA-8 2SLB
- C-6 and C-7: 1320-hp (9.5 MMBTU/hr) Ingersol-Rand KVS-8 four-stroke lean-burn (4SLB)
- C-8 and C-9: 1100-hp (9.5 MMBTU/hr) Cooper-Bessemer GMV-10 2SLB

C-5 has been out-of-service since 2006. The engine will be removed from the permit, and control measures for this unit will not be addressed further in this report. C-4 and C-8 are also currently out-of-service but will still be evaluated as part of this analysis. Additionally, DCP would like to point out that all affected engines are well below the established threshold of 50 MMBTU/hr for conducting a control measures analysis.

C-1, C-2, C-3, C-4, C-8, and C-9 are collectively referred to in this report as the "GMV engines", and C-6 and C-7 are referred to as the "KVS engines".

The following specific technical and economic information, where applicable, is provided in this report for each emissions reduction option considered in accordance with instructions in the July 1, 2020 request:

- Technical feasibility
- Control effectiveness
- Emissions reductions
- Time necessary for implementation[1]
- Remaining useful life[1]
- Energy and non-air quality environmental impacts[1]
- Costs of implementation[1]

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[1] These are the four factors that must be included in evaluating emission reduction measures necessary to make reasonable progress determinations. *See* 40 CFR § 51.308(f)(2)(i).

2. NO_X EMISSIONS REDUCTION OPTIONS

This report addresses the following NO_X emissions reduction options for the Chitwood units:

- Selective Catalytic Reduction (SCR)
- Clean Burn Technology (CBT)
- Good Combustion Practices

Potential hypothetical retrofit control options were identified through a comprehensive review of the Reasonably Available Control Technology (RACT) / Best Available Control Technology (BACT) / Lowest Achievable Emission Reduction (LAER) Clearinghouse (RBLC) and consultation with engine and control system engineering firms.

Good combustion practices include following concepts from engineering knowledge, experience, and manufacturer's recommendations to reduce NO_X emissions that are caused by oxidation of nitrogen in the combustion air during fuel combustion. Higher combustion temperatures and insufficiently mixed air and fuel in the cylinder can increase these emissions. Practices to reduce emissions can include, but are not limited to, proper equipment maintenance, routine inspections, and conducting overhauls as appropriate. These good combustion practices are currently in use at Chitwood, as required by various conditions in the permit. Accordingly, no further assessment of this control practice has been included in this report.

The remaining contents of this report discuss general hypothetical retrofit scenarios for these types of engines, but these scenarios are not based on an engineering analysis specific to each subject engine. These are unique engines and, if any analysis herein suggests that an engine may be amenable to retrofit actions as a function of a 4-factor analysis, then such engine would require a detailed, engineered engine health analysis and engineering and vendor assessment of whether that engine specifically can successfully accommodate a retrofit action. Such detailed engineering assessments would provide more accuracy around technical feasibility and cost and may conclude that a particular retrofit action is, for example, not technically feasible to be successfully implemented, or not economically reasonable.

2.1 Technical Feasibility

Clean Burn Technology (CBT) is another term for utilizing combustion mixtures with lean air-to-fuel ratios. This method of reducing NO_X emissions involves reconfiguring the engines by adding or enhancing an air-to-fuel ratio controller to make the unit capable of operating at ratios that generate less NO_X emissions. A combustion mixture with a higher air-to-fuel ratio results in reduced NO_X emissions because using fuel-lean mixtures lowers the combustion temperature by diluting energy input. 2SLB engines are typically designed to operate at the high air-to-fuel ratios employed in CBT, so by design these units are generally not amenable to an increase in air-to-fuel ratio to receive significant NO_X reduction benefits. Additionally, in order to avoid derating the engine, combustion air must be increased at constant fuel flow. To achieve this, the engine will need to be retrofitted with a turbocharger, which forces additional air into the combustion chamber, as well as an automatic air-to-fuel ratio controller. Many 2SLB engines, such as naturally aspirated engines, do not have identical air-to-fuel ratios in each cylinder, which can result in limited ability to vary the air-to-fuel ratio. Considering these limitations, and based on the advanced age and type of engine, it is difficult to determine potential costs and emissions reductions without a site assessment and further evaluation of the engines. Additionally, reliability issues could also arise from being unable to properly scope the project. For example, flame front impingement of the power cylinder heads could cause failure of the power cylinder and significant downtime. If any of the control options evaluated here are preliminarily deemed amenable to retrofit in the opinion of the agency and may be required by ODEQ, then DCP requests a minimum of three months to complete a full engineering and vendor evaluation, including an engine health analysis, and potentially update both the information provided in this report and the conclusions drawn in or from this report. However, DCP was able to obtain cost estimates from Siemens Energy assuming that these technical limitations can be overcome. The estimated costs and emissions reductions are included in Appendix A. Two separate CBT options were provided by the vendor, one that reduced emissions to 6 g/hp-hr (herein referred to the as the "6 gram" or "6 g" option) and one that reduced emissions to 1 g/hp-hr (herein referred to the as the "1 gram" or "1 g" option). Note, the 1 gram option will result in CO emissions increasing by approximately 40%. An oxidation catalyst will need to be installed in order to stay under current permit values, and the cost for this additional control is included in the cost control analysis.

SCR is considered technically feasible for all the affected units, but the control device vendor (AeriNOx Inc.) stated that SCR should not be used to reduce NO_X emissions from the GMV and KVS engines as they currently exist and are configured due to the large variance in NO_X outlet emissions and the high likelihood of combustion instability that will cause SCR to have poor control issues. Based on this guidance, it was determined that SCR would potentially be technically feasibly only after applying some type of CBT to stabilize the outlet emissions and combustion, and even then, the result may not be technically feasible. Additionally, there may be insufficient space in the facility to accommodate SCR systems, and as such, SCR may not be technically feasible under these circumstances.

2.2 Control Effectiveness

Table 2-1 lists the expected emission rates for the potentially technically feasible NO_X emissions reduction options. The controlled emission rates are based on vendor estimates included in Appendix A, and are subject to the qualifications, above, regarding detailed unit-specific engineering and vendor evaluations, if needed.

Table 2-1. Control Effectiveness of NO_X Emissions Reduction Options

NO_X Reduction Option	Control Efficiency (%)
CBT (6 g)	46 - 57
CBT (1 g)	91 - 93
CBT+SCR (1 g)	91 - 93

2.3 Emissions Reductions

Table 2-2 presents the controlled emission rates and emission reduction potentials for the technically feasible NO_X emissions reduction options. Baseline emission rates were based on RY2019 emissions, and emissions reductions were based on estimates provided by Siemens Energy and AeriNOx Inc. In order to account for year-to-year variability, and to provide a more accurate assessment of potential reductions, the RY2019 emissions were equally redistributed for each engine type and each engine service. C-1 and C-2 are in refrigeration service, C-4 is in inlet service, and the remaining engines are all in residue service. For the engines in residue service, emissions were only redistributed within each engine type (i.e., GMV-8, GMV-10, and KVS). The year-to-year variability is common with these types of facilities and can be attributed to various issues such as engine availability and maintenance. Therefore, we believe the proposed approach for baseline emissions most accurately represents typical engine operation. Detailed emissions calculations are included in Appendix A.

Table 2-2. Baseline and Controlled Emission Rates and Emissions Reductions of Control Options

Unit	Baseline NO_X Emission Rate (tpy)	NO_X Reduction Option	Controlled Emission Rate (tpy)	Emissions Reduction (tpy)
C-1	89.61	CBT (6 g)	38.40	51.21
		CBT (1 g)	6.40	83.21
		CBT+SCR (1 g)	6.40	83.21
C-2	89.61	CBT (6 g)	38.40	51.21
		CBT (1 g)	6.40	83.21
		CBT+SCR (1 g)	6.40	83.21
C-3	19.38	CBT (6 g)	8.31	11.07
		CBT (1 g)	1.38	18.00
		CBT+SCR (1 g)	1.38	18.00
C-4	72.36	CBT (6 g)	31.01	41.35
		CBT (1 g)	5.17	67.19
		CBT+SCR (1 g)	5.17	67.19
C-6	83.59	CBT (6 g)	45.59	38.00
		CBT (1 g)	7.60	75.99
		CBT+SCR (1 g)	7.60	75.99
C-7	83.59	CBT (6 g)	45.59	38.00
		CBT (1 g)	7.60	75.99
		CBT+SCR (1 g)	7.60	75.99
C-8	54.74	CBT (6 g)	23.46	31.28
		CBT (1 g)	3.91	50.83
		CBT+SCR (1 g)	3.91	50.83
C-9	54.74	CBT (6 g)	23.46	31.28
		CBT (1 g)	3.91	50.83
		CBT+SCR (1 g)	3.91	50.83

2.4 Time Necessary for Implementation

A minimum of five (5) years, counting from the effective rule applicability date of an approved determination, would be needed for implementing all of the controls, especially if controls are required for multiple engines as DCP will need to stagger the implementation so only one engine is down at a time.

The ODEQ’s regional haze second planning period (2PP) state implementation plan (SIP) must be submitted to EPA by July 31, 2021. Conservatively assuming a one-year EPA approval process, the earliest that any determination would be approved is August 1, 2022. Adding the times necessary for implementation to this date results in an earliest possible implementation date of all controls of August 1, 2027.

2.5 Remaining Useful Life

Except for C-5, DCP has no plans to retire any of the affected units at Chitwood. The remaining useful life (RUL) value for SCR and CBT is assumed to be 30 years based on guidance in EPA's Control Cost Manual.[2]

2.6 Energy and Non-Air Quality Environmental Impacts

SCR systems create a demand for electricity that currently does not exist, creates a new solid waste stream (spent catalyst) that must be managed, and poses a threat for potentially significant non-air quality environmental impacts because it requires the storage of large amounts of ammonia or urea. The storage of aqueous ammonia in quantities greater than 10,000 pounds is regulated by EPA's risk management program (RMP) because the accidental release of ammonia has the potential to cause serious injury and death.

Additionally, SCR will result in emissions of unreacted ammonia to the atmosphere (i.e., ammonia slip) during any periods of time when temperatures are too low for effective operation or if too much ammonia is injected (possibly in an attempt to reduce NO_X further). Ammonia emissions will react to directly form ammonium sulfate and ammonium nitrate – the compounds most responsible for regional haze in the Wichita Mountains Wildlife Refuge Class I area – emissions of ammonium sulfate and ammonium nitrate would detract from any haze-reducing NO_X emissions reductions from application of SCR.

The installation of CBT will result in increased noise output, which could affect both employee safety and nearby residences.

2.7 Costs

The following tables summarize the estimated costs, including total and annualized capital costs, annual operations and maintenance (O&M) costs, and cost effectiveness based on vendor estimates and the emission reduction values from Table 2-2 for the NO_X reduction options. These cost estimates are calculated according to the methods and recommendations in the EPA Air Pollution Control Cost Manual using vendor quotes as well as default assumptions from the Control Cost Manual.[3] These cost estimates are subject to the qualifications, above, regarding detailed unit-specific engineering and vendor evaluations, if needed.

Table 2-3. Estimated Costs of NO_X Emissions Reduction Options

Unit	NO_X Reduction Option	Capital Costs ($)	Annualized Capital Costs ($/year)	Annual O&M Costs ($/year)	Total Annual Costs ($/year)	Cost Effectiveness ($/ton)
C-1	CBT (6 g)	2,073,250	167,076	56,474	223,550	4,366
	CBT (1 g)	2,822,000	227,415	59,024	286,439	3,442
	CBT+SCR (1 g)	2,318,250	186,819	117,474	304,293	3,657
C-2	CBT (6 g)	2,073,250	167,076	56,474	223,550	4,366
	CBT (1 g)	2,822,000	227,415	59,024	286,439	3,442
	CBT+SCR (1 g)	2,318,250	186,819	117,474	304,293	3,657

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[2] U.S. EPA, "Air Pollution Control Cost Manual", available at: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution#cost%20manual

[3] U.S. EPA, "Air Pollution Control Cost Manual", available at: https://www.epa.gov/economic-and-cost-analysis-air-pollution-regulations/cost-reports-and-guidance-air-pollution#cost%20manual

C-3	CBT (6 g)	2,073,250	167,076	56,474	223,550	20,186
	CBT (1 g)	2,822,000	227,415	59,024	286,439	15,917
	CBT+SCR (1 g)	2,318,250	186,819	117,474	304,293	16,909
C-4	CBT (6 g)	2,073,250	167,076	56,474	223,550	5,407
	CBT (1 g)	2,822,000	227,415	59,024	286,439	4,263
	CBT+SCR (1 g)	2,318,250	186,819	117,474	304,293	4,529
C-6	CBT (6 g)	1,573,250	126,783	56,474	183,257	4,823
	CBT (1 g)	2,332,000	187,927	59,024	246,951	3,250
	CBT+SCR (1 g)	1,823,250	146,929	103,334	250,263	3,293
C-7	CBT (6 g)	1,573,250	126,783	56,474	183,257	4,823
	CBT (1 g)	2,332,000	187,927	59,024	246,951	3,250
	CBT+SCR (1 g)	1,823,250	146,929	103,334	250,263	3,293
C-8	CBT (6 g)	2,135,250	172,072	56,474	228,546	7,306
	CBT (1 g)	2,934,000	236,441	59,024	295,465	5,813
	CBT+SCR (1 g)	2,405,250	193,830	128,389	322,219	6,339
C-9	CBT (6 g)	2,135,250	172,072	56,474	228,546	7,306
	CBT (1 g)	2,934,000	236,441	59,024	295,465	5,813
	CBT+SCR (1 g)	2,405,250	193,830	128,389	322,219	6,339

Current emissions estimates are based on AP-42 factors and based on previous stack testing on C-9, DCP expects that actual emissions may be less, resulting in higher cost effectiveness values. For example, if C-9 were to utilize the highest test result value for RY2019 (8.9 g/hp-hr), the cost effectiveness value for the CBT (1 g) option would increase from $5,813/ton to $9,565/ton.

2.8 Conclusions

Whenever assessing the economic feasibility for each of these options, the following factors must also be considered:

1. The capital costs for all the potential control options range from $1.6 MM to $2.9 MM. The approximate cost to replace each of these engines are estimated to range from $2.5 MM to $3.2 MM. It would be unreasonable to require the facility to install controls on units for which the cost for control nearly exceeds the cost for replacing the units. Further, ODEQ should not select control options that, in reality or in effect, re-define the presently authorized emission source. Requiring the acquisition and installation/operation of retrofit technologies that are approximately the cost of replacement of the source equipment would result in this scenario, and the Clean Air Act would preclude re-defining an emissions source from an agency regulation.
2. The estimated sale value for each of the existing engines is approximately $50,000. It would be unreasonable to require the facility to install controls on units for which the cost for control exceeds the value of the unit itself by at least an order of magnitude. Further, ODEQ should not select control options that, in reality or in effect, re-define the presently authorized emission source. Requiring the acquisition and installation/operation of retrofit technologies that are far beyond the present value of the source equipment would result in this scenario, and the Clean Air Act would preclude re-defining an emissions source from an agency regulation.
3. The overall capital cost for this project would be between $15 MM and $21 MM, which represents a significant financial burden for a facility of this size, and none of these costs would be recoverable,

which is not the case for some of the other units being evaluated by ODEQ (e.g., electric generating units).
4. Based on an initial evaluation, there may not be enough room at the facility to install the evaluated SCR systems.
5. DCP does not currently employ SCR at any of their facilities and will potentially need to hire additional staff with SCR-specific expertise if this control option is required.
6. Previous stack testing on C-9 suggests that actual emissions are significantly lower than the AP-42 factors used for historical emissions reporting (14 g/hp-hr for GMV and 11 g/hp-hr for KVS). Using the highest test result value for RY2019 (8.9 g/hp-hr) increases the cost effectiveness for the 1-gram options by more than 60% for the GMV units.
7. Current control costs and emissions reductions estimates were determined without first conducting a site assessment or detailed evaluation of the engines, and more refined estimates based on unit-specific engineering and vendor evaluations will likely result in higher cost effectiveness values.

Even if the additional factors listed above were not taken into consideration, DCP believes the control cost effectiveness by itself demonstrates the economic infeasibility based on previous determinations in the Regional Haze program. In 81 FR 296, EPA used a cost effectiveness threshold of $3,332/ton for the first planning period reasonable progress four-factor analyses in Texas. EPA’s approval (83 FR 62230 and 84 FR 51033-40) of Arkansas’ first planning period SIP revisions included a reasonable progress analysis cost effectiveness value of $2,742/ton for a control option that was not required.

Therefore, taking into consideration both the calculated $/ton effectiveness and the additional factors mentioned above, DCP has determined that the installation of any additional control is cost-ineffective and is economically unreasonable.

APPENDIX A. EMISSIONS AND COSTS CALCULATIONS DETAILS

Engine Emissions Summary

EU ID	Description	Service	Type	hp	Control	Fuel Usage (Btu/hp-hr)	Emissions Factor (g/hp-hr)	RY2019 Emissions (tpy)	Average Emissions (tpy)
C-1	Cooper-Bessemer GMV-8	Multiservice	2SLB	880	None	8300	14.0	109.57	89.61
C-2	Cooper-Bessemer GMV-8	Multiservice	2SLB	880	None	8300	14.0	69.65	89.61
C-3	Cooper-Bessemer GMV-8	Residue	2SLB	880	None	8300	14.0	19.38	19.38
C-4	Cooper-Bessemer GMV-8	Inlet	2SLB	880	None	8300	14.0	72.36	72.36
C-6	Ingersol-Rand KVS-8	Residue	4SLB	1320	None	7200	11.0	121.56	83.59
C-7	Ingersol-Rand KVS-8	Residue	4SLB	1320	None	7200	11.0	45.62	83.59
C-8	Cooper-Bessemer GMV-10	Residue	2SLB	1100	None	8270	14.0	86.75	54.74
C-9	Cooper-Bessemer GMV-10	Residue	2SLB	1100	None	8270	14.0	22.73	54.74

[1] RY2013 emissions were used to calculate the baseline for C-4 since this was the most recent year of operation

[2] Averaged emissions are based on engine type and service

Control Device Costs

Control Description	Cost Source	GMV-8 1 gram option ($)	KVS-8 1 gram option ($)	GMV-10 1 gram option ($)	GMV-8 6 gram option ($)	KVS-8 6 gram option ($)	GMV-10 6 gram option ($)
Clean burn conversion equipment and installation	Siemens	1,710,000	1,420,000	1,800,000	1,120,000	820,000	1,160,000
Intercooler bundles for turbocharger addition	Siemens	125,000	125,000	125,000	125,000	125,000	125,000
Replacement exhaust manifolds for GMV units	Siemens	220,000	--	242,000	220,000	--	242,000
Updated air intake filters and housing	Siemens	100,000	100,000	100,000	100,000	100,000	100,000
Replacement cylinder heads	Siemens	40,000	60,000	40,000	40,000	60,000	40,000
Control panel installation	Siemens	250,000	250,000	250,000	250,000	250,000	250,000
Turbocharger pad installation	DCP	50,000	50,000	50,000	50,000	50,000	50,000
Initial engine health analysis	DCP	12,000	12,000	12,000	12,000	12,000	12,000
Safety/inspector/fire watch for each engine build	DCP	100,000	100,000	100,000	100,000	100,000	100,000
Engineering costs for project/site managers and engineer	DCP	56,250	56,250	56,250	56,250	56,250	56,250
HP fuel installation to engine room for 1 gram option	DCP	43,750	43,750	43,750	--	--	--
Oxidation catalyst installation for 1 gram option	Miratech	115,000	115,000	115,000	--	--	--
Total Capital Cost for clean burn technology	**--**	**2,822,000**	**2,332,000**	**2,934,000**	**2,073,250**	**1,573,250**	**2,135,250**
SCR equipment and installation	AeriNOx	245,000	250,000	270,000	--	--	--
CBT annual maintenance costs	Siemens	59,024	59,024	59,024	56,474	56,474	56,474
SCR annual maintenance costs	AeriNOx	61,000	46,860	71,915	--	--	--

Cost Effectiveness Calculations

EU ID	Control Option	g/hp-hr	DRE %	Controlled Emissions (tpy)	Emissions Reduction (tpy)	CRF (7% AIR)	Total Capital Cost ($)	Annualized Capital Cost ($)	Annual O&M Cost ($)	Total Annual Cost ($)	$/ton
C-1	SCR (6 to 1 g)	1	83.3	6.4	32.0	0.0806	245,000	19,744	61,000	80,744	--
	CBT (6 g)	6	57.1	38.4	51.2	0.0806	2,073,250	167,076	56,474	223,550	4,366
	CBT (1 g)	1	92.9	6.4	83.2	0.0806	2,822,000	227,415	59,024	286,439	3,442
	CBT+SCR (1 g)	1	92.9	6.4	83.2	0.0806	2,318,250	186,819	117,474	304,293	3,657
C-2	SCR (6 to 1 g)	1	83.3	6.4	32.0	0.0806	245,000	19,744	61,000	80,744	--
	CBT (6 g)	6	57.1	38.4	51.2	0.0806	2,073,250	167,076	56,474	223,550	4,366
	CBT (1 g)	1	92.9	6.4	83.2	0.0806	2,822,000	227,415	59,024	286,439	3,442
	CBT+SCR (1 g)	1	92.9	6.4	83.2	0.0806	2,318,250	186,819	117,474	304,293	3,657
C-3	SCR (6 to 1 g)	1	83.3	1.4	6.9	0.0806	245,000	19,744	61,000	80,744	--
	CBT (6 g)	6	57.1	8.3	11.1	0.0806	2,073,250	167,076	56,474	223,550	20,186
	CBT (1 g)	1	92.9	1.4	18.0	0.0806	2,822,000	227,415	59,024	286,439	15,917
	CBT+SCR (1 g)	1	92.9	1.4	18.0	0.0806	2,318,250	186,819	117,474	304,293	16,909
C-4	SCR (6 to 1 g)	1	83.3	5.2	25.8	0.0806	245,000	19,744	61,000	80,744	--
	CBT (6 g)	6	57.1	31.0	41.3	0.0806	2,073,250	167,076	56,474	223,550	5,407
	CBT (1 g)	1	92.9	5.2	67.2	0.0806	2,822,000	227,415	59,024	286,439	4,263
	CBT+SCR (1 g)	1	92.9	5.2	67.2	0.0806	2,318,250	186,819	117,474	304,293	4,529
C-6	SCR (6 to 1 g)	1	83.3	7.6	38.0	0.0806	250,000	20,147	46,860	67,007	--
	CBT (6 g)	6	45.5	45.6	38.0	0.0806	1,573,250	126,783	56,474	183,257	4,823
	CBT (1 g)	1	90.9	7.6	76.0	0.0806	2,332,000	187,927	59,024	246,951	3,250
	CBT+SCR (1 g)	1	90.9	7.6	76.0	0.0806	1,823,250	146,929	103,334	250,263	3,293
C-7	SCR (6 to 1 g)	1	83.3	7.6	38.0	0.0806	250,000	20,147	46,860	67,007	--
	CBT (6 g)	6	45.5	45.6	38.0	0.0806	1,573,250	126,783	56,474	183,257	4,823
	CBT (1 g)	1	90.9	7.6	76.0	0.0806	2,332,000	187,927	59,024	246,951	3,250
	CBT+SCR (1 g)	1	90.9	7.6	76.0	0.0806	1,823,250	146,929	103,334	250,263	3,293
C-8	SCR (6 to 1 g)	1	83.3	3.9	19.6	0.0806	270,000	21,758	71,915	93,673	--
	CBT (6 g)	6	57.1	23.5	31.3	0.0806	2,135,250	172,072	56,474	228,546	7,306
	CBT (1 g)	1	92.9	3.9	50.8	0.0806	2,934,000	236,441	59,024	295,465	5,813
	CBT+SCR (1 g)	1	92.9	3.9	50.8	0.0806	2,405,250	193,830	128,389	322,219	6,339
C-9	SCR (6 to 1 g)	1	83.3	3.9	19.6	0.0806	270,000	21,758	71,915	93,673	--
	CBT (6 g)	6	57.1	23.5	31.3	0.0806	2,135,250	172,072	56,474	228,546	7,306
	CBT (1 g)	1	92.9	3.9	50.8	0.0806	2,934,000	236,441	59,024	295,465	5,813
	CBT+SCR (1 g)	1	92.9	3.9	50.8	0.0806	2,405,250	193,830	128,389	322,219	6,339

[1] Annualized costs based on methodologies in the EPA Air Pollution Control Cost Manual and a remaining useful life of 30 years