APPENDIX B

AIR QUALITY AND GREENHOUSE GAS ANALYSIS REPORT

California Steel Industries, Inc.

Number 3 Continuous Galvanizing Line and Push Pull Pickle Line

SCAQMD Facility ID 46268

Air Quality and Greenhouse Gas Analysis

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1.0 INTRODUCTION

Ashworth Leininger Group (ALG) was contracted by California Steel Industries, Inc. (CSI), to perform emissions calculations and perform an air quality analysis of the impacts of stationary sources associated with the new galvanizing line (#3 CGL) and push pull pickle line (PPPL). ALG's analysis has been prepared to support the California Environmental Quality Act (CEQA) analysis for the project. This report is prepared based on design and emissions information provided by CSI.

The existing facility receives, by rail, semi-finished steel slabs, which are then processed sheet steel and further processed into either pipe or steel coil products. Two furnaces, Furnace No. 4 and Furnace No. 5 heat the steel slabs, which are then rolled into strips and rolled into coils. The coils may be sold directly to customers as hot rolled product or processed further on-site. Coils which are processed further are treated in a pickling line to remove surface scale and then cold rolled to final thickness. Cold rolled steel can either be sold directly to customers or further treated in one of two galvanizing lines, which add a galvanized layer to the surface of the steel to protect it from corrosion and extend its useful life.

The #3 CGL is designed similarly to the #1 and #2 CGLs. It will consist of the following equipment:

- an entry section consisting of two coil payoff reels feeding an electric lap seam welder,
- a cleaning section consisting of physical cleaning with brush scrubbers followed by a series of up to six 3,500- to 6,500-gallon tanks and rinse baths that utilize caustic cleaner to remove any impurities from the surface of the steel strip. This section will be connected to a fume exhaust system followed by a wet packed-bed scrubber,
- new combustion units including two heaters with a combined heat input of approximately 83 million British thermal units per hour (mmBtu/hr) and emissions control equipment to reduce carbon monoxide (CO) emissions using a 6 mmBtu/hr thermal afterburner and nitrogen oxide emissions using an SCR with a new 10,500-gallon aqueous ammonia storage tank,
- an induction heated refractory-lined coating pot that will hold approximately 225 metric tons of molten zinc (99% zinc and 1% aluminum) that the steel strip passes through,
- a chemical treating section consisting of two roll transfer coaters for applying different types of oxidation preventative or preparation coatings. One coater for trivalent chrome or hexavalent chrome application, equipped with a negative-pressure hood and vented to a high efficiency particulate air (HEPA) filter, and one water-based acrylic coating applicator to the strip that will be connected to a thermal oxidizer to eliminate Volatile Organic Compounds. This option is used if the coated coil will be painted by the customer on a process line or for some roof decking products, and
- an exit reel to coil the finished product.

A new 900 brake horsepower emergency generator will be installed adjacent to the south side of the #3 CGL building.

The PPPL component of the Project would install the following equipment:

- five 25,000-gallon storage tanks for fresh and spent solutions,
- fifteen 750- to 7,000-gallon process tanks,
- a 12,000-gallon rinse tank,
- a packed-bed scrubber to control acid emissions; and
- an exit reel to coil the finished product

2.0 AIR QUALITY

This section discusses the methodologies used to conduct the evaluation of air quality impacts for the project and technical methods employed in the evaluation. Emissions calculations are provided in Attachment A to this report; calculation strategies are summarized below. The project consists solely of constructing new equipment. No existing emission units at the site will be modified.

2.1 Emissions Calculation Methodology

2.1.1 Pre-Project Emissions

Because all equipment associated with the project is new, pre-Project emissions are equal to zero for all equipment associated with this project.

2.1.2 Post-Project Emissions

Criteria pollutant emission factors for all equipment are based on SCAQMD rule limits and default factors. This results in a conservative estimate because actual permit emission limits will be based on Best Available Control Technology (BACT) emissions levels, which will be determined at the time of permit issuance and must be as strict or stricter than the rule limits or default factors.

<u>CGL Heaters</u>

Two new heaters will be installed for the #3 CGL as part of this project. The heaters will exhaust to an afterburner to control carbon monoxide (CO) emissions and then to a selective catalytic reduction (SCR) system to control oxides of nitrogen (NOx) emissions. These heaters are assumed to operate 24 hours per day. Emission factors are based on SCAQMD natural gas combustion emission factors[1] and compliance with SCAQMD Rule 1147.2[2]. Emissions are calculated by multiplying the maximum fired duty by the appropriate emissions factor. Toxic pollutant emission factors are based on SCAQMD factors for natural gas combustion[3]. Greenhouse gas emission factors are based on 40 CFR Part 89[4] Tables C-1 and C-2 for natural gas. Detailed emission calculations are provided in Attachment A-3. Toxics emission calculations are provided in Attachment A-8.

Emergency Standby Engine

One new diesel-fired emergency standby engine will be installed. The engine will be certified to meet U.S. EPA Tier 4 emission standards for diesel-fired engines. The engine will operate for up to 2 hours per day and 50 hours per year for maintenance and testing purposes. If the facility loses electrical power, the engine may be used to provide standby electrical power. Total hours of operation for all purposes are assumed to be 200 hours per year. Emissions are calculated by multiplying the maximum horsepower rating by the appropriate emissions factor. Criteria pollutant emission factors are based on Tier 4 emission factors[5]. Toxic pollutant emission factors are based on the diesel PM emission rate. Greenhouse gas emission factors are based on 40 CFR Part 89 Tables C-1 and C-2 for diesel fuel combustion. Detailed emission calculations are provided in Attachment A-6. Toxics emission calculations are provided in Attachment A-8.

Cleaning Section

One new cleaning section will be installed. The cleaning section will exhaust through a wet packed-bed scrubber to control emissions. The cleaning section is assumed to operate 24 hours per day. Emissions are calculated by multiplying the flow rate out of the scrubber by the controlled exhaust concentration. Toxic pollutant emission factors are based on current permit limits on toxics content of materials processed at the facility. The cleaning section is not a source of greenhouse gas emissions. Detailed emission calculations are provided in Attachment A-4.

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[1] External Combustion Equipment - Natural Gas(mmscf)/Other Equipment https://www.aqmd.gov/docs/default-source/planning/annual-emission-reporting/default-combustion-emission-factors.pdf?sfvrsn=12

[2] South Coast Air Quality Management District, 2022. Rule 1147.2, April 1, 2022, Table 3, pg. 5, https://www.aqmd.gov/docs/default-source/rule-book/reg-xi/rule-1147-2.pdf?sfvrsn=8.

[3] AB 2588 Quadrennial Air Toxic Emissions Inventory Reporting Procedures – AER Program, Appendix B, Table B-1: Default EF for Natural Gas Combustion, External Combustion Equipment (Boiler, Oven, Dryer, Furnace, Heater, Afterburner), https://www.aqmd.gov/docs/default-source/planning/risk-assessment/quadrennial_atir_procedure.pdf

[4] Tables C-1 and C-2, https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-C

[5] EPA Nonroad Compression-Ignition Engines: Exhaust Emissions Standards, 560≤kW<900, 2015+, generator set standards, https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=P100OA05.pdf

Chem Treat

One new chem treat operation will be installed. The cleaning section will exhaust through a HEPA filter to control particulate matter and toxic emissions. The chem treat operation is assumed to operate 24 hours per day. Criteria pollutant emissions are calculated by multiplying the flow rate out of the HEPA filter by the controlled exhaust concentration. Toxic pollutant emission factors are based on source test data from the chem treat operation on the existing CGL #2[6]. The chem treat operation is not a source of greenhouse gas emissions. Detailed emission calculations are provided in Attachment A-4.

Ammonia Storage and Handling

A new ammonia storage tank will be installed for the ammonia to be used in the SCR. Ammonia usage is based on the projected demand from the SCR. Emissions from storage tanks are estimated following the fixed roof tank methodology of the June 2020 revision to AP-42 Chapter 7.1[7]. The ammonia storage and handling operation is not a source of greenhouse gas emissions. Detailed emission calculations are provided in Attachment A-7.

Coating Line Thermal Oxidizer

One new coating line that is vented to a thermal oxidizer to control VOC emissions will be installed. The coating line is assumed to operate 24 hours per day. Emissions are calculated by multiplying the maximum fired duty by the appropriate emissions factor[8]. Toxic pollutant emission factors are based on SCAQMD factors for natural gas combustion. Greenhouse gas emission factors are based on 40 CFR Part 89 Tables C-1 and C-2 for natural gas. Detailed emission calculations are provided in Attachment A-4. Toxics emission calculations are provided in Attachment A-8.

Push-Pull Pickle Line

One new PPPL will be installed. Emissions from the PPPL will be controlled by a packed bed scrubber. The PPPL is assumed to operate 24 hours per day. Emissions are calculated by multiplying the flow rate out of the packed bed scrubber by the controlled exhaust concentration. Toxic pollutant emission factors are based on U.S. EPA emission standards for pickle lines. The PPPL is not a source of greenhouse gas emissions. Detailed emission calculations are provided in Attachment A-5.

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[6] AirKinetics Engineering Test Report, California Steel Industries, Strip Dryer Inlet and Outlet

[7] https://www.epa.gov/sites/default/files/2020-10/documents/ch07s01.pdf

[8] Big River Steel LLC, RBLC ID AR-0173, Push Pull Pickle Line
https://cfpub.epa.gov/rblc/index.cfm?action=PermitDetail.ProcessInfo&facility_id=28975&PROCESS_ID=114353

Electricity Use

Electricity to the Project Site is provided by Southern California Edison. The Project modifications are expected to require 1.12 GWh per month (13.44 GWh per year). Project Greenhouse Gas emissions from electricity use are calculated using the default values for 2025 for Southern California Edison in CalEEMod Appendix G[9] Table 1.2 *Electrical Utility Emission Factors of Greenhouse Gases*. Unmitigated project emissions are calculated based on electricity intensity from Greenhouse Gas Emissions, Development Review Process, County of San Bernardino, CA, Attachment 3, Table 1

Water Use

Total water use for the project is estimated to be 79,100 gallons per day (approximately 28.5 million gallons per year). Electricity demand from water use is estimated using the default values for South Coast in CalEEMod Appendix G Table G-32 *Water Energy Intensity Factors by Hydrologic Region and Process*. Greenhouse Gas emissions from electricity associated water use are calculated based on the calculated electricity demand multiplied by the electrical utility emission factors of greenhouse gases. Direct greenhouse gas emissions from wastewater treatment are calculated based on the anaerobic treatment factors CalEEMod Appendix G Table G-35 *Annual Wastewater Treatment Direct Emission Factors*. Unmitigated project emissions from electricity demand from water use is calculated based on electricity intensity factors from Table 7 of *Refining Estimates of Water-Related Energy Use in California*[10]*.* Unmitigated biogenic emissions from treatment of waster are not calculated, as they are not part of the calculations specified in *Greenhouse Gas Emissions, Development Review Process, County of San Bernardino, California*.

2.2 Summary of Emission Changes

As described previously, operation of the project will result in emissions from new sources at the facility. Table 1 is used to compare against CEQA daily thresholds. Table 2 is used to compare against CEQA annual thresholds. Detailed emissions calculations are included in Attachment A to this report.

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[9] https://caleemod.com/user-guide

[10] Because emission factors for electricity associated with wastewater processing are calculated on a per-resident basis in *Greenhouse Gas Emissions, Development Review Process, County of San Bernardino, California*, unmitigated emissions are calculated based on *Refining Estimates of Water-Related Energy Use in California.* https://www.sandiegocounty.gov/content/dam/sdc/pds/ceqa/Soitec-Documents/Final-EIR-Files/references/rtcref/ch3.1.3/2014-12-19_CEC2006.pdf

Table 1 Summary of Emissions (lbs/day)

Emission Source	Emissions (lbs/day)					
	ROG	NOx	SOx	CO	PM_{10}	$PM_{2.5}$
CGL Heaters	11.19	38.45	1.28	79.03	15.46	15.46
Emergency Standby Engine	0.56	1.98	0.02	10.32	0.09	0.09
Cleaning Section	0.00	0.00	0.00	0.00	4.94	4.94
Chem Treat	0.00	0.00	0.00	0.00	0.93	0.93
Ammonia Storage and Handling	0.00	0.00	0.00	0.00	0.00	0.00
Coating Line Thermal Oxidizer	1.26	8.64	0.14	17.76	1.74	1.74
Push-Pull Pickle Line	0.00	0.00	0.00	0.00	10.91	10.91
Total Combined Emissions	**13.00**	**49.07**	**1.45**	**107.11**	**34.05**	**34.05**
CEQA Mass Daily Threshold	**55**	**55**	**150**	**550**	**150**	**55**
Significant?	**No**	**No**	**No**	**No**	**No**	**No**

Table 2 Summary of Emissions (tons/year)

Emission Source	Emissions (tons/year) [CO2e (MT/yr)]						
	ROG	NOx	SOx	CO	PM_{10}	$PM_{2.5}$	CO2e
CGL Heaters	2.04	7.02	0.23	14.42	2.82	2.82	41,398.9
Emergency Standby Engine	0.01	0.02	0.00	0.13	0.00	0.00	23.7
Cleaning Section	0.00	0.00	0.00	0.00	0.90	0.90	0.0
Chem Treat	0.00	0.00	0.00	0.00	0.17	0.17	0.0
Ammonia Storage and Handling	0.00	0.00	0.00	0.00	0.00	0.00	0.0
Coating Line Thermal Oxidizer	0.14	0.47	0.02	0.97	0.19	0.19	4,651.6
Push-Pull Pickle Line	0.00	0.00	0.00	0.00	1.99	1.99	0.0
Total Combined Emissions – Onsite Emissions	**2.19**	**7.51**	**0.25**	**15.52**	**6.07**	**6.07**	**46,074.2**
Electricity Use	--	--	--	--	--	--	2,138
Water Use	--	--	--	--	--	--	3,067
Total Project-Related Emissions	**2.19**	**7.51**	**0.25**	**15.52**	**6.07**	**6.07**	**51,279**

2.2.1 Comparing Project Unmitigated and Mitigated Emissions

The project GHG emissions with and without mitigation are compared consistent with the procedure specified in Attachment 3 of the *Greenhouse Gas Emissions, Development Review Process, County of San Bernardino, California*

GHG emissions from the stationary source combustion equipment associated with the Project are required to comply with CARB's Mandatory Reporting Rule and the AB 32 Cap-and-Trade regulations. Since the CSI facility is included in the AB32 Cap-and-Trade Program, an allowance (offset) in an amount equal to the GHG emissions from non-biogenic sources are required to be provided for combustion GHG emissions from the stationary source equipment.

Mitigated GHG emissions from electricity use, water use, and wastewater use are calculated as described in section 2.1.2 above. Note that biogenic emissions from wastewater treatment are excluded from unmitigated and mitigated emissions in Table 3 below for the purpose of determining the reduction in emissions due to mitigation. The percent reduction from unmitigated to mitigated emissions is calculated both for all project emissions and for only water and electricity-related emissions.

Table 3 Summary of GHG Emissions – County of San Bernardino Methodology

Emission Source	CO2e (MT/Year)
Unmitigated GHG Emissions	
Onsite Combustion Emissions	46,074.2
Electricity Use	16,743
Water Use	4,623
Total Combined Emissions – Unmitigated	**67,440**
Mitigated GHG Emissions	
Onsite Combustion Emissions following Offset	0
Electricity Use	2,138
Water Use*	309
Total Combined Emissions - Mitigated	**2,447**
Percent Reduction – All Project Emissions	**96%**
Percent Reduction – Electricity and Water Use	**89%**
Significant?	**No**

*Does not include biogenic emissions from wastewater treatment.

In addition, project emissions are compared to SCAQMD significance thresholds. Consistent with SCAQMD, construction emissions and biogenic emissions from wastewater treatment are also included in the analysis. Construction emissions calculations are included in the *Construction Emissions Analysis* for this project.

Table 4 Summary of GHG Emissions – SCAQMD Methodology

Emission Source	CO2e (MT/Year)
GHG Emissions	
Onsite Combustion Emissions	46,074.2
Electricity Use	2,138
Water Use	3,067
Construction Emissions	52
Total Project-Related Emissions	**51,279**
GHG Emission Offsets Required	46,074
Total Project-Related Emissions following Offset	**5,205**
SCAQMD CEQA GHG Threshold	**10,000**
Significant?	**No**

3.0 CONCLUSION

Emissions calculations indicate that increases in daily emissions of all criteria pollutants are less than the SCAQMD's respective CEQA mass daily significance thresholds. GHG emissions from the project are more than 31% below unmitigated emissions. Therefore, the impacts of criteria pollutant and greenhouse gas emissions from the project are expected to be less than significant.

ATTACHMENT A. EMISSION SUMMARIES

California Steel
Project Emissions
Attachment A-1 On-Site Emissions Summary

	Daily Potential to Emit (lbs/day)							
	CGL Heaters	Emergency Standby Engine	Cleaning Section	Chem Treat	Ammonia Storage and Handling	Coating Line Thermal Oxidizer	Push-Pull Pickle Line	Total Emissions
NOx	38.45	1.98				8.64		**49.07**
SOx	1.28	0.02				0.14		**1.45**
CO	79.03	10.32				17.76		**107.11**
PM	15.46	0.09	4.94	0.93		1.74	10.91	**34.05**
PM10	15.46	0.09	4.94	0.93		1.74	10.91	**34.05**
PM2.5	15.46	0.09	4.94	0.93		1.74	10.91	**34.05**
ROG	11.19	0.56				1.26		**13.00**
NH3	0.82				2.81			**3.63**

	Annual Potential to Emit (ton/year)								
	CGL Heaters	Emergency Standby Engine	Cleaning Section	Chem Treat	Ammonia Storage and Handling	Coating Line Thermal Oxidizer	Push-Pull Pickle Line	Total Emissions	
NOx	7.02	0.02				0.47		**7.51**	
SOx	0.23	0.00				0.02		**0.25**	
CO	14.42	0.13				0.97		**15.52**	
PM	2.82	0.00	0.90	0.17		0.19	1.99	**6.07**	
PM10	2.82	0.00	0.90	0.17		0.19	1.99	**6.07**	
PM2.5	2.82	0.00	0.90	0.17		0.19	1.99	**6.07**	
ROG	2.04	0.01				0.14		**2.19**	
NH3	0.15				0.00			**0.15**	
CO2e	41,399	23.71				4,652		**46,074.16**	**MT/year**

California Steel
Project Emissions
Attachment A-2 Off-Site Greenhouse Gas Emissions

Electricty Use - Unmitigated Emissions

Electricity Use	13,440	MWh/year
CO2	290.87	kg/MWh
CH4	13.88	kg/MWh
N2O	2.04	kg/MWh
CH4	25	kg CO2e/kg
N20	298	kg CO2e/kg
Intensity Emission Factor	1245.79	kg CO2e/MWh
GHG Emissions	**16,743**	**MT CO2e/year**

Emission Factor from Greenhouse Gas Emissions, Development Review Process, County of San Bernardino, CA, Attachment 3, Table 1

Electricty Use - Mitigated Emissions

Electricity Use	13,440	MWh/year
CO2	348.637	lb/MWh
CH4	0.033	lb/MWh
N2O	0.004	lb/MWh
CH4	25	lb CO2e/lb
N20	298	lb CO2e/lb
Intensity Emission Factor	350.654	lb CO2e/MWh
GHG Emissions	**2,138**	**MT CO2e/year**

Emission Factor from CalEEMod Appendix G, Table G-3

Water Use - Unmitigated Emissions

Water Use	285	million gallons per year
Electricity Intensity	13,022	kWh/million gallons
Total Electricity Use	3,711,270	kWh/year
Intensity Emission Factor	1245.79	kg CO2e/MWh
GHG Emissions - Electricity Use	**4,623**	**MT CO2e/year**

Electricity Intensity from water supply, treatment, distribution, and wastewater treatment are from Refining Estimates of Water-Related Energy Use in California, Table 7. Recommended revised water-energy proxies

Water Use - Mitigated Emissions

Water Use	285	million gallons per year
Electricity Intensity	6,807	kWh/million gallons
Total Electricity Use	1,939,995	kWh/year
Intensity Emission Factor	350.654	lb CO2e/MWh
GHG Emissions - Electricity Use	**309**	**MT CO2e/year**
CO2 Wastewater Treatment	3.90E-07	Ton CO2/gallon
CH4 Wastewater Treatment	4.01E-07	Ton CH4/gallon
N20 Wastewater Treatment	8.52E-10	Ton N2O/gallon
CH4	25	lb CO2e/lb
N20	298	lb CO2e/lb
GHG Emissions - Wastewater Treatment	**2,758**	**MT CO2e/year**

Electricity Intensity from CalEEMod Appendix G, Table G-32
Wastewater Treatment Direct Emissions from CalEEMod Appendix G, Table G-35

Appendix A
Emissions Calculations

Combustion Equipment

CGL Heaters	41,399	MT CO2e/year
Emergency Standby Engine	23.71	MT CO2e/year
Coating Line Thermal Oxidizer	4,652	MT CO2e/year
GHG Emissions from Combustion	**46,074**	**MT CO2e/year**

Project-Related GHG Emissions

Electricity Use	2,138	MT CO2e/year
Water Use	3,067	MT CO2e/year
Combustion	46,074	MT CO2e/year
Total	**51,279**	**MT CO2e/year**

California Steel
Project Emissions
Attachment A-3 Combustion Equipment Emission Calculations

Heater 1

Furnace Rating:	57	MMBtu/hr

	Proposed EF	Units	PTE (lbs/hour)	PTE (lbs/day)	PTE (lb/month)	PTE (tpy)	
NOx	0.018	lb/mmbtu	1.03	24.62	738.72	4.49	
SOx	0.0006	lbs/mmbtu	0.03	0.82	24.62	0.15	
CO	0.037	lb/mmbtu	2.11	50.62	1,518.48	9.24	
PM	0.0072	lb/mmbtu	0.41	9.90	297.05	1.81	
PM10	0.0072	lb/mmbtu	0.41	9.90	297.05	1.81	
PM2.5	0.0072	lb/mmbtu	0.41	9.90	297.05	1.81	
ROG	0.0052	lb/mmbtu	0.30	7.17	214.97	1.31	
GHG	53.1	kg/MMBtu				26,514	**MT/year**

Heater 2

Furnace Rating:	26	MMBtu/hr

	Proposed EF	Units	PTE (lbs/hour)	PTE (lbs/day)	PTE (lb/month)	PTE (tpy)	
NOx	0.018	lb/mmbtu	0.47	11.23	336.96	2.05	
SOx	0.0006	lbs/mmbtu	0.02	0.37	11.23	0.07	
CO	0.037	lb/mmbtu	0.96	23.09	692.64	4.21	
PM	0.0072	lb/mmbtu	0.19	4.52	135.50	0.82	
PM10	0.0072	lb/mmbtu	0.19	4.52	135.50	0.82	
PM2.5	0.0072	lb/mmbtu	0.19	4.52	135.50	0.82	
ROG	0.0052	lb/mmbtu	0.14	3.27	98.06	0.60	
GHG	53.1	kg/MMBtu				12,094	**MT/year**

Afterburner

Furnace Rating:	6	MMBtu/hr

	Proposed EF	Units	PTE (lbs/hour)	PTE (lbs/day)	PTE (lb/month)	PTE (tpy)	
NOx	0.018	lb/mmbtu	0.11	2.59	77.76	0.47	
SOx	0.0006	lbs/mmbtu	0.00	0.09	2.59	0.02	
CO	0.037	lb/mmbtu	0.22	5.33	159.84	0.97	
PM	0.0072	lb/mmbtu	0.04	1.04	31.27	0.19	
PM10	0.0072	lb/mmbtu	0.04	1.04	31.27	0.19	
PM2.5	0.0072	lb/mmbtu	0.04	1.04	31.27	0.19	
ROG	0.0052	lb/mmbtu	0.03	0.75	22.63	0.14	
GHG	53.1	kg/MMBtu				2,791	**MT/year**

California Steel
Project Emissions
Attachment A-4 Continuous Galvanizing Line Process Emissions Calculations

Cleaning Section Exhaust

Design Flow Rate 8000 CFM

	Proposed EF	Units	PTE (lbs/hour)	PTE (lbs/day)	PTE (lb/month)	PTE (tpy)
PM	0.003	gr/dscf	0.21	4.94	148.11	0.90
PM10	0.003	gr/dscf	0.21	4.94	148.11	0.90
PM2.5	0.003	gr/dscf	0.21	4.94	148.11	0.90
Arsenic	0.001	% weight	2.06E-06	4.94E-05	1.48E-03	9.01E-06
Beryllium	0.001	% weight	2.06E-06	4.94E-05	1.48E-03	9.01E-06
Cadmium	0.001	% weight	2.06E-06	4.94E-05	1.48E-03	9.01E-06
Chromium	0.1	% weight	2.06E-04	4.94E-03	1.48E-01	9.01E-04
Copper	0.3	% weight	6.17E-04	1.48E-02	4.44E-01	2.70E-03
Lead	0.001	% weight	2.06E-06	4.94E-05	1.48E-03	9.01E-06
Manganese	1.65	% weight	3.39E-03	8.15E-02	2.44E+00	1.49E-02
Mercury	0.001	% weight	2.06E-06	4.94E-05	1.48E-03	9.01E-06
Nickel	0.1	% weight	2.06E-04	4.94E-03	1.48E-01	9.01E-04
Selenium	0.001	% weight	2.06E-06	4.94E-05	1.48E-03	9.01E-06

Metals content per condition B27.2

Chem Treat Surface Passivation Exhaust

Design Flow Rate 1500 CFM

	Proposed EF	Units	PTE (lbs/hour)	PTE (lbs/day)	PTE (lb/month)	PTE (tpy)
PM	0.003	gr/dscf	0.04	0.93	27.77	0.17
PM10	0.003	gr/dscf	0.04	0.93	27.77	0.17
PM2.5	0.003	gr/dscf	0.04	0.93	27.77	0.17
CR6+			6.13E-07	1.47E-05	4.41E-04	2.68E-06

Coating Line Thermal Oxidizer - Controlled Emissions

Furnace Rating:	10	MMBtu/hr

	Proposed EF	Units	PTE (lbs/hour)	PTE (lbs/day)	PTE (lb/month)	PTE (tpy)	
NOx	0.036	lb/mmbtu	0.36	8.64	259.20	1.58	
SOx	0.0006	lbs/mmbtu	0.01	0.14	4.32	0.03	
CO	0.074	lb/mmbtu	0.74	17.76	532.80	3.24	
PM	0.0072	lb/mmbtu	0.07	1.74	52.11	0.32	
PM10	0.0072	lb/mmbtu	0.07	1.74	52.11	0.32	
PM2.5	0.0072	lb/mmbtu	0.07	1.74	52.11	0.32	
ROG	0.0052	lb/mmbtu	0.05	1.26	37.71	0.23	
GHG	53.1	kg/MMBtu				4,652	**MT/year**

Appendix A
Emissions Calculations

California Steel
Project Emissions
Attachment A-5 Push Pull Pickle Line Process Emissions Calculations

Design Flow Rate	24100	CFM
Conversion	7000	gr/lb

	Proposed EF	Units	PTE (lbs/hour)	PTE (lbs/day)	PTE (lb/month)	PTE (tpy)
PM	0.0022	gr/dscf	0.45	10.91	327.21	1.99
PM10	0.0022	gr/dscf	0.45	10.91	327.21	1.99
PM2.5	0.0022	gr/dscf	0.45	10.91	327.21	1.99
HCl	6	ppm	0.83	20.00	600.01	3.65

Proposed EF based on RACT/BACT/LAER Clearinghouse. AR-0173 Big River Steel
HCL rate based on 40 CFR 63 Standard for continuous pickling lines

California Steel
Project Emissions
Attachment A-6 Emergency Standby Engine Emissions Calculations

Engine Rating	900	bhp
Daily Operation	2	hours
Annual Operation	50	hours (Maintenance and Testing)
Annual Operation	200	hours (All Purposes)
Fuel consumption	7100	Btu/hp-hr*
Fuel Density	7.05	lb/gal*
Fuel Heat content	19433	Btu/lb*
Sulfur content	0.0015	percent by weight
Heat Input	6.390	MMBtu/hr at peak HP
F-Factor	9,220	dscf/mmbtu

*Default assumption

Emission Factors

	NOx	ROG	CO	PM
g/hp-hr	0.500	0.140	2.600	0.022

Tier 4 Factors

Emissions

	NOx	ROG	CO	PM	PM10	PM2.5	SOx	CO2e	
lb/hour	0.99	0.28	5.16	0.04	0.04	0.04	0.010		
lb/day	1.98	0.56	10.32	0.09	0.09	0.09	0.020		
lb/year	49.60	13.89	257.94	2.18	2.18	2.18	0.493	23.7	Maintenance and Testing
lb/year	198.42	55.56	1031.76	8.73	8.73	8.73	1.973	94.8	All Purposes

GHG Emissions are presented in Metric Tons

CO2 Emission Factor Calculation
Emission Factors

Compound	Factor	Units
CO2	73.96	kg/MMBtu
CH4	0.003	kg/MMBtu
N2O	0.0006	kg/MMBtu

Global Warming Potential

Compound	Factor	Units
CO2	1	lbCO2e/lb
CH4	25	lbCO2e/lb
N2O	298	lbCO2e/lb

CO2e Emission Factor

CO2e	74.2138	kg CO2e/MMBtu
CO2e	163.6134	lb CO2e/MMBtu

California Steel
Project Emissions
Attachment A-7 Ammonia Storage Tank Emissions Calculations

Parameters	Value	Notes
Operating Schedule		
Operating Days per Year	365	
Operating Hours per Day	24	
Tank Parameters		
Shell Height, H (ft)	14.58	
Shell Diameter, D (ft)	11.87	
Tank Capacity (gal)	10,500	
Tank Condition/Color	Good/White	
Breather Vent Pressure Setting, P_{BP} (psig)	18	
Breather Vent Vacuum Setting, P_{BV} (psig)	0.29	
Throughput of Aqueous Ammonia Solution, Q (gal/yr)	24,000	
Meteorological Data		
Daily Average Liquid Surface Temperature, T_{LA} (F)	68.08	Taken from EPA TANKS using Los Angeles C.O., CA meteorological data
Daily Min Liquid Surface Temperature, T_{LN} (F)	62.92	
Daily Max Liquid Surface Temperature, T_{LX} (F)	73.24	
Daily Vapor Temperature Range, ΔT_V (R)	20.65	
Ambient Pressure, P_A (psia)	14.67	
Properties of Ammonia		
Weight Fraction of Ammonia in Aqueous Solution	19.9%	The maximum concentration from the SDS
Molecular Weight of Ammonia	17.03	
Henry's Constant of Ammonia at 298.15 K, k_H^o (M/atm)	61	Taken from "Compliation of Henry's Law Constants for Inorganic and Organic Species of Potential Importance in Environmental Chemistry", Rolf Sande, http://www.henrys-law.org/henry-3.0.pdf
$-d(\ln(k_H))/d(1/T)$ for Ammonia (K)	4,200	
Henry's Constant for Ammonia at T_{LA}, k_H (M/atm)	77.39	Calculated as $k_H = k_H^o \times \exp(-d(\ln(k_H))/d(1/T)(1/T-1/298.15)$
Henry's Constant for Ammonia at T_{LN}, k_H (M/atm)	89.16	
Henry's Constant for Ammonia at T_{LX}, k_H (M/atm)	67.37	
20% Aqueous Ammonia Solution Density (g/ml)	1	Assumed to have the density of water
Partial Pressure of Ammonia at T_{LA} (psia)	2.22	Calculated using Henry's Law ($p=k_Hc$)
Partial Pressure of Ammonia at T_{LN} (psia)	1.93	
Partial Pressure of Ammonia at T_{LX} (psia)	2.55	
AP-42 Section 7.1 Calculations		
Vapor Space Outage, H_{VO} (ft)	4.66	$(\pi D/4)/2$, AP42 7.1 Eq. 1-14 & 1-15
Tank Vapor Space Volume, V_V (ft^3)	807	L x D x H_{VO}, AP42 7.1 Eq. 1-3 & 1-13
Ammonia Vapor Density at T_{LA}, W_V (lb/ft^3)	0.007	MW x $p_{TLA}/R/T_{LA}$, AP42 7.1 Eq 1-21
Vapor Space Expansion Factor, K_E	0.000	$\Delta T_V/T_{LA} + (p_{TLX}-p_{TLN}-(P_{BP}-P_{BV})/(P_A-p_{TLA})$, AP42 7.1 Eq 1-7
Vented Vapor Saturation Factor, K_S	0.65	$1/(1+0.053 \times p_{TLA} \times H_{VO})$, AP42 7.1 Eq 1-20
Ammonia Standing Loss, L_S (lbs/yr)	0.00	Days x V_V x W_V x K_E x K_S, AP42 7.1 Eq 1-2
Pressure 60 deg F (psia)	3.51	Perry's Chemical Engineering Handbook, 4th Edition
Pressure 70 deg F (psia)	4.56	Perry's Chemical Engineering Handbook, 4th Edition
Pressure at 68.08 deg F (psia)	4.36	interpolated
P1 (psig)	18.0	conservatively assumed equal to breather vent setting
PA (psi)	14.7	atmospheric pressure
KN	1	saturation factor
PVA (psia)	4.4	vapor pressure at average daily liquid surface temperature
PBP (psig)	18	breather vent setting
KB	1	Eq 1-41
Q-Pre (gal/year)	24,000	from application
VQ-Pre (ft^3/year)	3208	Eq 1-39
KN	1	turnovers < 36
WV (lb/ft^3)	0.006672	Eq 1-22
KP	1	working loss factor
LW-Pre	21.40	lb/year
Vapor Return Line Collection	70%	percent
LW-Pre - Controlled	6.42	lb/year
Total Ammonia Emissions, L_T (lbs/yr)	6.42	

Ammonia Emissions and Toxic Screening (CAS No. 7664-41-7)		
Annual Emissions (lbs/yr)	6.42	
Maximum Hourly Emissions (lbs/hr)	2.81	Calculated with standing loss equal to the annual standing loss divided by 8,760 hours per year and working loss with a max hourly throughput of 1 tank turnover
Maximum Daily Emissions (lbs/day)	2.81	Calculated with standing loss equal to the annual standing loss divided by 365 days per year and working loss with a max daily throughput of 1 tank turnover

Appendix A
Emissions Calculations

California Steel
Project Emissions
Attachment A-8 Combustion Toxics Emissions Calculations

		Heater No 1		**Heater No 2**		**Afterburner**		**SCR**		**Total Exhaust**	**Diesel Engine**		**Thermal Oxidizer**	
CAS No	Toxic Chemical	EF (lb/MMcf)	Emissions (lb/hr)	EF (lb/MMcf)	Emissions (lb/hr)	EF (lb/MMcf)	Emissions (lb/hr)	N/A	Emissions (lb/hr)	**Emissions (lb/hr)**	N/A	Emissions (lb/hr)	EF (lb/MMcf)	Emissions (lb/hr)
75070	Acetaldehyde	0.0031	1.683E-04	0.0031	7.676E-05	0.0043	2.457E-05			**2.696E-04**			0.0043	4.095E-05
107028	Acrolein	0.0027	1.466E-04	0.0027	6.686E-05	0.0027	1.543E-05			**2.289E-04**			0.0027	2.571E-05
7664417	Ammonia								0.03	**3.423E-02**				
71432	Benzene	0.0058	3.149E-04	0.0058	1.436E-04	0.008	4.571E-05			**5.042E-04**			0.008	7.619E-05
100414	Ethylbenzene	0.0069	3.746E-04	0.0069	1.709E-04	0.0095	5.429E-05			**5.997E-04**			0.0095	9.048E-05
50000	Formaldehyde	0.0123	6.677E-04	0.0123	3.046E-04	0.017	9.714E-05			**1.069E-03**			0.017	0.0001619
91203	Naphthalene	0.0003	1.629E-05	0.0003	7.429E-06	0.0003	1.714E-06			**2.543E-05**			0.0003	2.857E-06
110543	n-Hexane	0.0046	2.497E-04	0.0046	1.139E-04	0.0063	3.600E-05			**3.996E-04**			0.0063	0.00006
1151	PAH's (including naphthalene)	0.0004	2.171E-05	0.0004	9.905E-06	0.0004	2.286E-06			**3.390E-05**			0.0004	3.81E-06
115071	Propylene	0.53	2.877E-02	0.53	1.312E-02	0.731	4.177E-03			**4.607E-02**			0.731	0.0069619
108883	Toluene	0.0265	1.439E-03	0.0265	6.562E-04	0.0366	2.091E-04			**2.304E-03**			0.0366	0.0003486
1330207	Xylenes	0.0197	1.069E-03	0.0197	4.878E-04	0.0272	1.554E-04			**1.713E-03**			0.0272	0.000259
9901	Diesel PM											0.04		

Natural Gas Combustion Emission Factors from *VCAPCD AB2588 Combustion Emission*