

APPENDIX G
Air Quality Tables

Attachment 3 REVISED ADDENDUM- ASRC Emission Calculations

Basis:

- The American Sugar Refining Company, Inc. currently operates three (3) combustion sources as per the facility's Title V permit.
- The three combustion sources are known as "Boiler #3", "Boiler #4" and Gas Turbine".
- All combustion sources are permitted to combust natural gas and fuel oil.
- Emission factors are from the following AP-42 Sections and Tables:
 - Section 1.3, Tables 1.3-1, 1.3-9 & 1.3-10 - Boilers firing fuel oil.
 - Section 1.4, Tables 1.4-1, 1.4-3 & 1.4-4 - Boilers firing natural gas.
 - Section 3.1, Tables 3.1-1, 3.1-2a, 3.1-4 & 3.1-5 - Turbines firing fuel oil.
 - Section 3.1, Tables 3.1-1, 3.1-2a, 3.1-3 - Turbines firing natural gas.
- Boiler and Turbine potential emissions based on 2010 Emissions Inventory
- NOx emissions are based on stack test data. See additional notes below.
- Only those compounds defined as HAPs as per Section 112(b) of the Clean Air Act.
- Certain compounds are considered "Polycyclic Organic Matter (POM)", and are therefore, considered HAPs.

Maximum Annual Fuel Throughputs:

Boiler #3	NG burned in 2010	713.7 MMscf/yr 727,974 MMBtu/yr	- Based on 2010 Emission Inventory
	Fuel Oil Burned in 2010:	0.0366 MMGal/yr 5,051 MMBtu/yr	- Based on 2010 Emission Inventory
Turbine (Boiler #5)	NG burned in 2010	722.5 MMscf/yr 736,950 MMBtu/yr	- Based on 2010 Emission Inventory
	Fuel Oil Burned in 2010:	0.0141 MMGal/yr 1,946 MMBtu/yr	- Based on 2010 Emission Inventory - Based on 138,000 BTU/gallon
Boiler #4	NG burned in 2010	121.3 MMscf/yr 123,726 MMBtu/yr	
	Fuel Oil Burned in 2010:	0.00 MMgal/yr	

Boiler Total (NG) 851,700 MMBtu/yr
835 MMscf/yr

Boiler Total (Oil) 5,051 MMBtu/yr - Based on 138,000 BTU/gallon
0.0366 Mgal/yr

	Emission Factor (lb/MMBtu)	Emission Rate (lb/yr)
NOx Emissions: Boiler #3 ¹	Nat gas #2 Fuel Oil	Nat gas #2 Fuel Oil
Turbine (Boiler #5) ^{2,3}	0.073 0.102	53,142.1 515.2
Boiler #4 ¹	0.152 0.242	112,016.4 470.9
	0.095 0.150	11,754.0 0.0
	Total NOx Emissions per Fuel:	176,912.5
	Total NOx Emissions:	177,898.5

Notes: ¹ Emission factors based on January 2007 stack testing.

² Emission factors based on December 2010 stack testing. A total of four (4) load points were tested in December 2010. The maximum NOx emission rate was used to calculate actual emissions for this analysis, regardless of load.

³ The 2010 stack test data was provided in ppm only. As such, emissions were converted to lb/MMBtu as per EPA Method 19, equation 19-1.

Pollutant Emissions:

Pollutant	Emission Factors (Natural Gas)				Emission Factors (Fuel Oil)				Emission Rates (Natural Gas)				Emission Rates (Fuel Oil)			
	Boilers #3 & #4		Turbine		Boilers #3 & #4		Turbine		Boilers #3 & #4		Turbine		Boilers #3 & #4		Turbine	
	(lb/MMscf)	(lb/MMBtu)	(lb/MMBtu)	(lb/MMBtu)	(lb/Mgal)	(lb/MMBtu)	(lb/MMBtu)	(lb/MMBtu)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)	(lb/yr)
Criteria Pollutants																
SO2	6.00E-01	3.40E-03	7.10E+00	3.30E-02	7.10E+00	3.30E-02	3.30E-02	5.01E+02	2.46E+00	2.60E-01	2.46E+00	2.60E-01	6.42E+01	6.42E+01	6.42E+01	6.42E+01
CO	8.40E+01	8.20E-02	5.00E+00	3.30E-03	5.00E+00	3.30E-03	3.30E-03	7.01E+04	5.92E+01	1.83E-01	5.92E+01	1.83E-01	6.42E+00	6.42E+00	6.42E+00	6.42E+00
NOx (see above)																
PM10	7.60E+00	6.60E-03	2.00E+00	1.20E-02	2.00E+00	1.20E-02	1.20E-02	6.35E+03	4.77E+00	7.32E-02	4.77E+00	7.32E-02	2.33E+01	2.33E+01	2.33E+01	2.33E+01
PM2.5	7.60E+00	6.60E-03	2.00E+00	1.20E-02	2.00E+00	1.20E-02	1.20E-02	6.35E+03	4.77E+00	7.32E-02	4.77E+00	7.32E-02	2.33E+01	2.33E+01	2.33E+01	2.33E+01
Hazardous Air Pollutants (HAPs)																
1,3-Butadiene	---	4.30E-07	---	1.60E-05	---	1.60E-05	---	---	3.11E-04	---	3.11E-04	---	3.11E-02	3.11E-02	3.11E-02	3.11E-02
2-Methylnaphthalene	2.40E-05	---	---	---	---	---	---	2.00E-02	---	---	---	---	---	---	---	---
3-Methylchloranthene	1.80E-06	---	---	---	---	---	---	1.50E-03	---	---	---	---	---	---	---	---
7,12-Dimethylbenz(a)anthracene	1.60E-05	---	---	---	---	---	---	1.34E-02	---	---	---	---	---	---	---	---
Acenaphthene	1.80E-06	---	2.11E-05	---	2.11E-05	---	---	1.50E-03	---	7.72E-07	---	7.72E-07	---	---	---	---
Acenaphthylene	1.80E-06	---	2.53E-07	---	2.53E-07	---	---	1.50E-03	---	9.26E-09	---	9.26E-09	---	---	---	---
Acetaldehyde	---	4.00E-05	---	---	---	---	---	---	2.89E-02	---	2.89E-02	---	---	---	---	---
Acrolein	---	6.40E-06	---	---	---	---	---	---	4.62E-03	---	4.62E-03	---	---	---	---	---
Anthracene	2.40E-06	---	1.22E-06	---	1.22E-06	---	---	2.00E-03	---	4.47E-08	---	4.47E-08	---	---	---	---
Benz(a)anthracene	1.80E-06	---	4.01E-06	---	4.01E-06	---	---	1.50E-03	---	1.47E-07	---	1.47E-07	---	---	---	---
Benzene	2.10E-03	1.20E-05	2.14E-04	5.50E-05	2.14E-04	5.50E-05	---	1.75E+00	8.67E-03	7.83E-06	8.67E-03	7.83E-06	1.07E-01	1.07E-01	1.07E-01	1.07E-01
Benzo(a)pyrene	1.80E-06	---	1.48E-06	---	1.48E-06	---	---	1.00E-03	---	---	---	---	---	---	---	---
Benzo(b)fluoranthene	1.80E-06	---	1.48E-06	---	1.48E-06	---	---	1.00E-03	---	5.42E-08	---	5.42E-08	---	---	---	---
Benzo(g,h,i)pyrene	1.20E-06	---	---	---	---	---	---	1.00E-03	---	---	---	---	---	---	---	---
Benzo(k)fluoranthene	1.80E-06	---	1.48E-06	---	1.48E-06	---	---	1.50E-03	---	5.42E-08	---	5.42E-08	---	---	---	---
Chrysene	1.80E-06	---	2.38E-06	---	2.38E-06	---	---	1.50E-03	---	8.71E-08	---	8.71E-08	---	---	---	---
Dibenzo(a,h)anthracene	1.20E-06	---	1.67E-06	---	1.67E-06	---	---	1.00E-03	---	6.11E-08	---	6.11E-08	---	---	---	---
Dichlorobenzene	1.20E-03	---	---	---	---	---	---	1.00E+00	---	---	---	---	---	---	---	---
Ethylbenzene	---	3.20E-05	6.36E-05	---	6.36E-05	---	---	---	2.31E-02	2.33E-06	2.31E-02	2.33E-06	---	---	---	---
Fluoranthene	3.00E-06	---	4.84E-06	---	4.84E-06	---	---	2.51E-03	---	1.77E-07	---	1.77E-07	---	---	---	---
Fluorene	2.80E-06	---	4.47E-06	---	4.47E-06	---	---	2.34E-03	---	1.64E-07	---	1.64E-07	---	---	---	---
Formaldehyde	7.50E-02	7.10E-04	3.30E-02	2.80E-05	3.30E-02	2.80E-05	---	6.26E+01	5.13E-01	1.21E-03	5.13E-01	1.21E-03	5.45E-02	5.45E-02	5.45E-02	5.45E-02
Hexane	1.80E+00	---	---	---	---	---	---	1.50E+03	---	---	---	---	---	---	---	---
Indeno(1,2,3-cd)pyrene	1.80E-06	---	2.14E-06	---	2.14E-06	---	---	1.50E-03	---	7.83E-08	---	7.83E-08	---	---	---	---
Naphthalene	6.10E-04	1.30E-06	1.13E-03	3.50E-05	1.13E-03	3.50E-05	---	5.09E-01	9.39E-04	4.14E-05	9.39E-04	4.14E-05	6.81E-02	6.81E-02	6.81E-02	6.81E-02
PAH	---	2.20E-06	---	4.00E-05	---	4.00E-05	---	---	1.59E-03	---	1.59E-03	---	7.78E-02	7.78E-02	7.78E-02	7.78E-02
Phenanthrene	1.70E-05	---	1.05E-05	---	1.05E-05	---	---	1.42E-02	---	3.84E-07	---	3.84E-07	---	---	---	---
Propylene Oxide	---	2.90E-05	---	---	---	---	---	---	2.10E-02	---	2.10E-02	---	---	---	---	---
Pyrene	5.00E-06	---	4.25E-06	---	4.25E-06	---	---	4.18E-03	---	1.56E-07	---	1.56E-07	---	---	---	---
1,1,1-Trichloroethane	---	---	2.36E-04	---	2.36E-04	---	---	---	---	8.64E-06	---	8.64E-06	---	---	---	---
Toluene	3.40E-03	1.30E-04	6.20E-03	---	6.20E-03	---	---	2.84E+00	9.39E-02	2.27E-04	9.39E-02	2.27E-04	---	---	---	---
o, Xylene	---	---	1.09E-04	---	1.09E-04	---	---	---	---	3.99E-06	---	3.99E-06	---	---	---	---
Xylenes (Total)	---	6.40E-05	---	---	---	---	---	---	4.62E-02	---	4.62E-02	---	---	---	---	---
OCDD (Octachlorodibenzo-p-dioxin)	---	---	3.10E-09	---	3.10E-09	---	---	---	---	1.13E-10	---	1.13E-10	---	---	---	---
Metals (HAPs)																
Arsenic	2.00E-04	---	4.00E+00	1.10E-05	4.00E+00	1.10E-05	---	1.67E-01	---	1.46E-01	---	1.46E-01	2.14E-02	2.14E-02	2.14E-02	2.14E-02
Beryllium	1.20E-05	---	3.00E+00	3.10E-07	3.00E+00	3.10E-07	---	1.00E-02	---	1.10E-01	---	1.10E-01	6.03E-04	6.03E-04	6.03E-04	6.03E-04
Cadmium	1.10E-03	---	3.00E+00	4.80E-06	3.00E+00	4.80E-06	---	9.19E-01	---	1.10E-01	---	1.10E-01	9.34E-03	9.34E-03	9.34E-03	9.34E-03
Chromium	1.40E-03	---	---	1.10E-05	---	1.10E-05	---	1.17E+00	---	---	---	---	2.14E-02	2.14E-02	2.14E-02	2.14E-02
Cobalt	8.40E-05	---	---	---	---	---	---	7.01E-02	---	---	---	---	---	---	---	---
Lead	---	---	9.00E+00	1.40E-05	9.00E+00	1.40E-05	---	---	---	3.29E-01	---	3.29E-01	2.72E-02	2.72E-02	2.72E-02	2.72E-02
Manganese	3.80E-04	---	6.00E+00	7.90E-04	6.00E+00	7.90E-04	---	3.17E-01	---	2.20E-01	---	2.20E-01	1.54E+00	1.54E+00	1.54E+00	1.54E+00
Mercury	2.60E-04	---	3.00E+00	1.20E-06	3.00E+00	1.20E-06	---	2.17E-01	---	1.10E-01	---	1.10E-01	2.33E-03	2.33E-03	2.33E-03	2.33E-03
Nickel	2.10E-03	---	3.00E+00	4.60E-06	3.00E+00	4.60E-06	---	1.75E+00	---	1.10E-01	---	1.10E-01	8.95E-03	8.95E-03	8.95E-03	8.95E-03
Selenium	2.40E-05	---	1.50E+01	2.50E-05	1.50E+01	2.50E-05	---	2.00E-02	---	5.49E-01	---	5.49E-01	4.86E-02	4.86E-02	4.86E-02	4.86E-02

Notes:
 - The facility has one (1) true boiler (Boiler No. 3), a turbine and a duct burner. The turbine and duct burner are used individually or in combination.
 - The duct burner, by itself, is listed as Boiler No. 4 and the turbine, in combination with the duct burner, is listed as Boiler No. 5.
 - "---" indicates compound not emitted from combustion source.

Attachment 3A - ASRC HAP Short-term (1-hr) Emission Calculations

Basis:

- The American Sugar Refining Company, Inc. currently operates three (3) combustion sources as per the facility's Title V permit.
- The three combustion sources are known as "Boiler #3", "Turbine" and "Duct Burner (Boiler #4)".
- All combustion sources are permitted to combust natural gas and fuel oil.
- Emission factors are from the following AP-42 Sections and Tables:

Section 1.3, Tables 1.3-1, 1.3-9 & 1.3-10 - Boilers firing fuel oil.

Section 1.4, Tables 1.4-1, 1.4-3 & 1.4-4 - Boilers firing natural gas.

Section 3.1, Tables 3.1-1, 3.1-2a, 3.1-4 & 3.1-5 - Turbines firing fuel oil.

Section 3.1, Tables 3.1-1, 3.1-2a, 3.1-2a, 3.1-3 - Turbines firing natural gas.

- Boiler maximum hourly emissions based on maximum fuel input ratings for each unit.

- Maximum hourly NOx emissions based on 2007 stack test data (see below).

- Only those compounds defined as HAPs as per Section 112(b) of the Clean Air Act.

Certain compounds are considered "Polycyclic Organic Matter (POM)", and are therefore, considered HAPs.

Maximum Hourly Design Rates:

Boiler #3	165 MMBtu/hr	Firing natural gas Firing No. 2 oil	0.165 MMscf/hr 1.20 Mgal/hr	- Based on 1,000 Btu/scf - Based on 138,000 BTU/gallon
Duct Burner (Boiler #4)	164 MMBtu/hr	Firing natural gas Firing No. 2 oil	0.164 MMscf/hr 1.19 Mgal/hr	- Based on 1,000 Btu/scf - Based on 138,000 BTU/gallon
Turbine	58 MMBtu/hr			
Boiler Total (NG)	329 MMBtu/hr 0.329 MMscf/hr			
Boiler Total (Oil)	329 MMBtu/hr 3.29E-04 TBtu/hr 2.384 Mgal/hr			

Maximum Hourly NOx Emissions:

Basis:

- Maximum emission rates based 2007 stack testing.
- Oil combustion produced the highest NOx emission rate and was therefore, selected for this evaluation.
- The maximum hourly test run was selected from the 3-run test.
- NOx emissions were determined via EPA Method 2 and EPA Method 19 (flow rates). The maximum NOx emission rate was selected for each emission unit as shown below.

	NOx Emission (lb/hr)	
	EPA Method 2	EPA Method 19
Boiler #3	13.41	13.25
Turbine and Duct Burner combined	20.86	22.66
Total NOx Emissions:	36.07	

Pollutant Emissions:

Pollutant	Emission Factors (Natural Gas)			Emission Factors (Fuel Oil)			Emission Rates (Natural Gas)			Emission Rates (Fuel Oil)		
	Boilers #3 & #4 (lb/MMscf)	Turbine (lb/MMBtu)	Boilers #3 & #4 (lb/Mgal)	Turbine (lb/MMBtu)	Boilers #3 & #4 (lb/hr)	Turbine (lb/hr)	Boilers #3 & #4 (lb/hr)	Turbine (lb/hr)	Boilers #3 & #4 (lb/hr)	Turbine (lb/hr)	Boilers #3 & #4 (lb/hr)	Turbine (lb/hr)
Criteria Pollutants												
SO2	6.00E-01	3.40E-03	7.10E+00	3.30E-02	1.97E-01	1.97E-01	1.97E-01	1.97E-01	1.69E+01	1.91E+00	1.91E+00	1.91E+00
CO	8.40E+01	8.20E-02	5.00E+00	3.30E-03	2.76E+01	4.76E+00	4.76E+00	4.76E+00	1.19E+01	1.91E-01	1.91E-01	1.91E-01
NOx (see comment above)												
PM10	7.60E+00	6.60E-03	2.00E+00	1.20E-02	2.50E+00	3.83E-01	3.83E-01	3.83E-01	4.77E+00	6.96E-01	6.96E-01	6.96E-01
PM2.5	7.60E+00	6.60E-03	2.00E+00	1.20E-02	2.50E+00	3.83E-01	3.83E-01	3.83E-01	4.77E+00	6.96E-01	6.96E-01	6.96E-01
Hazardous Air Pollutants (HAPs)												
1,3-Butadiene	2.40E-05	4.30E-07	---	1.60E-05	7.90E-06	2.49E-05	2.49E-05	2.49E-05	---	9.28E-04	---	---
2-Methylnaphthalene	1.80E-06	---	---	---	5.92E-07	---	---	---	---	---	---	---
3-Methylchloranthene	1.60E-05	---	---	---	5.26E-06	---	---	---	---	---	---	---
7,12-Dimethylbenz(a)anthracene	1.80E-06	---	2.11E-05	---	5.92E-07	---	---	---	6.94E-09	---	---	---
Acenaphthene	1.80E-06	---	2.53E-07	---	5.92E-07	---	---	---	8.32E-11	---	---	---
Acenaphthylene	---	4.00E-05	---	---	---	2.32E-03	---	---	---	---	---	---
Acetaldehyde	---	6.40E-06	---	---	---	3.71E-04	---	---	---	---	---	---
Acrolein	2.40E-06	---	1.22E-06	---	7.90E-07	---	---	---	4.01E-10	---	---	---
Anthracene	1.80E-06	---	4.01E-06	---	5.92E-07	---	---	---	1.32E-09	---	---	---
Benz(a)anthracene	2.10E-03	1.20E-05	2.14E-04	5.50E-05	6.91E-04	6.96E-04	6.96E-04	6.96E-04	7.04E-08	3.19E-03	---	---
Benzene	1.20E-06	---	---	---	3.95E-07	---	---	---	---	---	---	---
Benzofluoranthene	1.80E-06	---	1.48E-06	---	5.92E-07	---	---	---	4.87E-10	---	---	---
Benzofluoranthene	1.20E-06	---	---	---	3.95E-07	---	---	---	---	---	---	---
Benzo(g,h,i)pyrene	1.80E-06	---	1.48E-06	---	5.92E-07	---	---	---	4.87E-10	---	---	---
Benzo(k)fluoranthene	1.80E-06	---	2.38E-06	---	5.92E-07	---	---	---	7.83E-10	---	---	---
Chrysene	1.20E-06	---	1.67E-06	---	3.95E-07	---	---	---	5.49E-10	---	---	---
Dibenzo(a,h)anthracene	1.20E-03	---	---	---	3.95E-04	---	---	---	---	---	---	---
Dichlorobenzene	---	3.20E-05	6.36E-05	---	---	1.86E-03	---	---	---	---	---	---
Ethylbenzene	3.00E-06	---	4.84E-06	---	9.87E-07	---	---	---	1.59E-09	---	---	---
Fluoranthene	2.80E-06	---	4.47E-06	---	9.21E-07	---	---	---	1.47E-09	---	---	---
Fluorene	7.50E-02	7.10E-04	3.30E-02	2.80E-05	2.47E-02	4.12E-02	4.12E-02	4.12E-02	1.09E-05	1.62E-03	---	---
Formaldehyde	1.80E+00	---	---	---	5.92E-01	---	---	---	---	---	---	---
Hexane	1.80E+00	---	2.14E-06	---	5.92E-07	---	---	---	7.04E-10	---	---	---
Indeno(1,2,3-cd)pyrene	6.10E-04	1.30E-06	1.13E-03	3.50E-05	2.01E-04	7.54E-05	7.54E-05	7.54E-05	3.72E-07	2.03E-03	---	---
Naphthylene	---	2.20E-06	---	4.00E-05	---	1.28E-04	---	---	---	2.32E-03	---	---
PAH	1.70E-05	---	1.05E-05	---	5.59E-06	---	---	---	3.45E-09	---	---	---
Phenanthrene	---	2.90E-05	---	---	---	1.68E-03	---	---	---	---	---	---
Propylene Oxide	5.00E-06	---	4.25E-06	---	1.65E-06	---	---	---	1.40E-09	---	---	---
Pyrene	---	---	2.36E-04	---	---	---	---	---	7.76E-08	---	---	---
1,1,1-Trichloroethane	3.40E-03	1.30E-04	6.20E-03	---	1.12E-03	7.54E-03	7.54E-03	7.54E-03	2.04E-06	---	---	---
Toluene	---	---	1.09E-04	---	---	---	---	---	3.59E-08	---	---	---
o, Xylene	---	6.40E-05	---	---	---	3.71E-03	---	---	---	---	---	---
Xylenes (Total)	---	---	3.10E-09	---	---	---	---	---	1.02E-12	---	---	---
OCDD (Octachlorodibenzo-p-dioxin)	---	---	---	---	---	---	---	---	---	---	---	---
Metals (HAPs)												
Arsenic	2.00E-04	---	4.00E+00	1.10E-05	6.58E-05	1.10E-05	1.10E-05	1.10E-05	1.32E-03	6.38E-04	6.38E-04	6.38E-04
Beryllium	1.20E-05	---	3.00E+00	3.10E-07	3.95E-06	3.10E-07	3.10E-07	3.10E-07	9.87E-04	1.80E-05	1.80E-05	1.80E-05
Cadmium	1.10E-03	---	3.00E+00	4.80E-06	3.62E-04	4.80E-06	4.80E-06	4.80E-06	9.87E-04	2.78E-04	2.78E-04	2.78E-04
Chromium	1.40E-03	---	---	1.10E-05	4.61E-04	1.10E-05	1.10E-05	1.10E-05	---	6.38E-04	6.38E-04	6.38E-04
Cobalt	8.40E-05	---	---	---	2.76E-05	---	---	---	---	---	---	---
Lead	---	---	9.00E+00	1.40E-05	9.00E+00	1.40E-05	1.40E-05	1.40E-05	2.96E-03	8.12E-04	8.12E-04	8.12E-04
Manganese	3.80E-04	---	6.00E+00	7.90E-04	6.00E+00	7.90E-04	7.90E-04	7.90E-04	1.97E-03	4.58E-02	4.58E-02	4.58E-02
Mercury	2.60E-04	---	3.00E+00	1.20E-06	8.55E-05	1.20E-06	1.20E-06	1.20E-06	9.87E-04	6.96E-05	6.96E-05	6.96E-05
Nickel	2.10E-03	---	3.00E+00	4.60E-06	6.91E-04	4.60E-06	4.60E-06	4.60E-06	9.87E-04	2.67E-04	2.67E-04	2.67E-04
Selenium	2.40E-05	---	1.50E+01	2.50E-05	7.90E-06	2.50E-05	2.50E-05	2.50E-05	4.94E-03	1.45E-03	1.45E-03	1.45E-03

Notes:
- The facility has one (1) true boiler (Boiler No. 3), a turbine and a duct burner. The turbine and duct burner are used individually or in combination.
- The duct burner, by itself, is listed as Boiler No. 4 and the turbine, in combination with the duct burner, is listed as Boiler No. 5.
- Emission rates in bold indicate the higher emission rate of the two (2) fuels if that specific compound is emitted from combustion of both fuels.
- "----" indicates compound not emitted from combustion source.

Table 9
Microturbine Modeled Air Quality Impacts and N/SAAQS Comparison

Maximum modeled concentrations @ 1.0 g/s emissions rate:

1-Hour Concentration = 335.2 $\mu\text{g}/\text{m}^3$
 3-Hour Concentration = 301.7 $\mu\text{g}/\text{m}^3$ - Based on USEPA of adjustment factor 0.9.
 8-Hour Concentration = 234.6 $\mu\text{g}/\text{m}^3$ - Based on USEPA of adjustment factor 0.7.
 24-Hour Concentration = 134.1 $\mu\text{g}/\text{m}^3$ - Based on USEPA of adjustment factor 0.4.
 Annual Concentration = 26.8 $\mu\text{g}/\text{m}^3$ - Based on USEPA of adjustment factor 0.08.

Pollutant	Emission Rate (g/s)	Averaging Period	Maximum Modeled Impact ($\mu\text{g}/\text{m}^3$)	Background Values ($\mu\text{g}/\text{m}^3$)	Total Impact ($\mu\text{g}/\text{m}^3$)	N/SAAQS ($\mu\text{g}/\text{m}^3$)
Criteria Pollutant						
NOx	0.008	1-Hour	2.7	162.5	165.2	188
		Annual	0.2	41.5	41.7	100
CO	0.064	1-Hour	21.5	3,886	3,907	10,000
		8-Hour	15.0	2,778	2,793	40,000
SO2	0.001	3-Hour	0.3	171.6	171.9	1,300
		24-Hour	0.1	80.8	80.9	365
		Annual	0.03	14.4	14.4	80
PM10	0.004	24-Hour	0.5	57.0	57.5	150
PM2.5	0.004	24-Hour	0.5	27.4	27.9	35
		Annual	0.1	13.2	13.3	15.0
Hazardous Pollutant				SGC/AGC ($\mu\text{g}/\text{m}^3$)		
1,3-Butadiene	2.7E-07	1-Hour	9.05E-05	N/A		
		Annual	7.24E-06	0.03		
Acetaldehyde	2.55E-05	1-Hour	8.55E-03	4,500		
		Annual	6.84E-04	0.45		
Benzene	7.65E-06	1-Hour	2.56E-03	1,300		
		Annual	2.05E-04	0.13		
Ethylbenzene	2.04E-05	1-Hour	6.84E-03	54,000		
		Annual	5.47E-04	1,000		
Formaldehyde	4.53E-04	1-Hour	1.52E-01	30		
		Annual	1.21E-02	0.06		
Naphthalene	8.29E-07	1-Hour	2.78E-04	7,900		
		Annual	2.22E-05	3.0		
PAH	1.4E-06	1-Hour	4.69E-04	N/A		
		Annual	3.75E-05	0.02		
Propylene Oxide	1.85E-05	1-Hour	6.20E-03	3,100		
		Annual	4.96E-04	0.27		
Toluene	8.29E-05	1-Hour	2.78E-02	37,000		
		Annual	2.22E-03	5,000		
Xylenes	4.14E-05	1-Hour	1.39E-02	4,300		
		Annual	1.11E-03	100		

Notes:

- Adjustment factors based on Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019).
- Annual impacts assume units operate 8,760 hours per year at maximum capacity.
- All emission factors from USEPA AP-42 Section 3.1, except for NOx, CO and VOC, which are from the manufacturer.
- N/A - No standard for averaging period.
- Values in Red have been changed since the original submittal.

Table 10 REVISION No. 2
Nearby Source Modeled Air Quality Impacts and AGC/SGC Comparison

Maximum hourly modeled concentration @ 1.0 g/s emissions rate:
 1-Hour Concentration = 39.8 µg/m³
 Annual average modeled concentration @ 1.0 g/s emissions rate:
 1-Hour Concentration = 55.0 µg/m³
 Annual Concentration = 4.4 µg/m³ - Based on USEPA adjustment factor of 0.08.

Pollutant	Emission Rate (g/s)	Averaging Period	Modeled Impact (µg/m3)	SGC/AGC (µg/m3)	Pollutant	Emission Rate (g/s)	Averaging Period	Modeled Impact (µg/m3)	SGC/AGC (µg/m3)
1,3-Butadiene	1.17E-04	1-Hour	4.68E-03	---	Indeno(1,2,3-cd)pyrene	7.46E-08	1-Hour	2.97E-06	N/A
	4.52E-07	Annual	1.99E-06	3.30E-02		2.16E-08	Annual	9.51E-08	N/A
2-methylnaphthalene	9.95E-07	1-Hour	3.96E-05	---	Naphthalene	2.81E-04	1-Hour	1.12E-02	7.90E+03
	2.88E-07	Annual	1.27E-06	7.10E+00		8.32E-06	Annual	3.66E-05	3.00E+00
3-methylchloranthrene	7.46E-08	1-Hour	2.97E-06	N/A	Nitrogen Dioxide (NO ₂)	4.54E+00	1-Hour	1.81E+02	1.88E+02
	2.16E-08	Annual	9.51E-08	N/A		2.56E+00	Annual	1.13E+01	1.00E+02
Maximum Hourly Design Rates:	6.63E-07	1-Hour	2.64E-05	N/A	PAH	1.14E-06	1-Hour	1.16E-02	---
	1.92E-07	Annual	8.48E-07	N/A		6.88E-01	Annual	5.03E-06	2.00E-02
Acenaphthene	7.46E-08	1-Hour	2.97E-06	N/A	PM10	9.17E-02	1-Hour	2.74E+01	3.80E+02
	2.16E-08	Annual	9.52E-08	N/A		6.88E-01	Annual	4.03E-01	N/A
Acenaphthylene	7.46E-08	1-Hour	2.97E-06	N/A	PM2.5	9.17E-02	1-Hour	2.74E+01	1.60E+02
	2.16E-08	Annual	9.51E-08	N/A		9.17E-02	Annual	4.03E-01	1.50E+01
Acetaldehyde	2.92E-04	1-Hour	1.18E-02	4.50E+03	Phenanthrene	7.05E-07	1-Hour	2.80E-05	---
	4.16E-07	Annual	1.89E-06	4.50E-01		2.04E-07	Annual	8.98E-07	2.00E-02
Acrolein	4.68E-05	1-Hour	1.86E-03	2.50E+00	Propylene Oxide	2.12E-04	1-Hour	8.43E-03	3.10E+03
	6.65E-08	Annual	2.93E-07	3.50E-01		3.01E-07	Annual	1.33E-06	2.70E-01
Anthracene	9.95E-08	1-Hour	3.96E-06	---	Pyrene	2.07E-07	1-Hour	8.25E-06	---
	2.88E-08	Annual	1.27E-07	2.00E-02		6.01E-08	Annual	2.64E-07	2.00E-02
Benz(a)anthracene	7.46E-08	1-Hour	2.97E-06	---	Sulfur Dioxide (SO ₂)	2.37E+00	1-Hour	9.45E+01	1.97E+02
	2.16E-08	Annual	9.51E-08	2.00E-02		8.17E-03	Annual	3.59E-02	8.00E+01
Benzene	4.89E-04	1-Hour	1.95E-02	1.30E+03	1,1,1-Trichloroethane	9.78E-09	1-Hour	3.89E-07	9.00E+03
	2.69E-05	Annual	1.18E-04	1.30E-01		1.09E-03	Annual	5.47E-10	5.00E+03
Benz(o)pyrene	4.97E-08	1-Hour	1.98E-06	---	Toluene	1.09E-03	1-Hour	4.34E-02	3.70E+04
	1.44E-08	Annual	6.34E-08	9.10E-04		4.22E-05	Annual	1.86E-04	5.00E+03
Benzo(b)fluoranthene	7.46E-08	1-Hour	2.97E-06	N/A	o-Xylene	4.52E-09	1-Hour	1.80E-07	4.30E+03
	2.16E-08	Annual	9.51E-08	N/A		5.74E-11	Annual	2.52E-10	1.00E+02
Benzo(g,h,i)pyrene	4.97E-08	1-Hour	1.98E-06	N/A	Xylenes (Total)	4.68E-04	1-Hour	1.86E-02	4.30E+03
	1.44E-08	Annual	6.34E-08	N/A		6.65E-07	Annual	2.93E-06	1.00E+02
Benzo(k)fluoranthene	7.46E-08	1-Hour	2.97E-06	N/A	OCDD (Octachlorodibenzo-p dioxin	1.29E-13	1-Hour	5.11E-12	N/A
	2.16E-08	Annual	9.51E-08	N/A		1.63E-15	Annual	7.18E-15	N/A
Carbon Monoxide (CO)	4.08E+00	1-Hour	1.62E+02	1.40E+04	Arsenic	2.46E-04	1-Hour	9.80E-03	---
	1.01E+00	Annual	4.44E+00	N/A		4.82E-06	Annual	2.12E-05	2.30E-04
Chrysene	7.46E-08	1-Hour	2.97E-06	---	Beryllium	1.27E-04	1-Hour	5.04E-03	---
	2.16E-08	Annual	9.51E-08	2.00E-02		1.73E-06	Annual	7.62E-06	4.20E-04
Dibenz(a,h)anthracene	4.97E-08	1-Hour	1.98E-06	---	Cadmium	1.59E-04	1-Hour	6.34E-03	---
	1.44E-08	Annual	6.34E-08	2.00E-02		1.49E-05	Annual	6.57E-05	2.40E-04
Dichlorobenzene*	4.97E-05	1-Hour	1.98E-03	3.00E+04	Chromium	1.38E-04	1-Hour	5.51E-03	---
	1.44E-05	Annual	6.34E-05	9.00E-02		1.71E-05	Annual	7.53E-05	4.50E+01
Ethylbenzene	2.34E-04	1-Hour	9.31E-03	5.40E+04	Cobalt	3.48E-06	1-Hour	1.39E-04	---
	3.33E-07	Annual	1.46E-06	1.00E+03		1.01E-06	Annual	4.44E-06	1.00E-03
Fluoranthene	1.24E-07	1-Hour	4.95E-06	N/A	Lead	4.75E-04	1-Hour	1.89E-02	---
	3.60E-08	Annual	1.59E-07	N/A		5.13E-06	Annual	2.26E-05	3.80E-02
Fluorene	1.16E-07	1-Hour	4.62E-06	N/A	Manganese	6.02E-03	1-Hour	2.40E-01	---
	3.36E-08	Annual	1.48E-07	N/A		2.98E-05	Annual	1.31E-04	5.00E-02
Formaldehyde	8.30E-03	1-Hour	3.30E-01	3.00E+01	Mercury	1.33E-04	1-Hour	5.30E-03	6.00E-01
	9.09E-04	Annual	4.00E-03	6.00E-02		4.74E-06	Annual	2.08E-05	3.00E-01
Hexane	7.46E-02	1-Hour	2.97E+00	---	Nickel	1.58E-04	1-Hour	6.29E-03	6.00E+00
	2.16E-02	Annual	9.51E-02	7.00E+02		2.69E-05	Annual	1.18E-04	4.20E-03
					Selenium	8.05E-04	1-Hour	3.20E-02	---
						8.88E-06	Annual	3.91E-05	2.00E+01

Notes:
 - Annual adjustment factors based on Screening Procedures for Estimating the Air Quality Impact of Stationary Sources, Revised (EPA-454/R-92-019).
 - Annual impacts were derived from actual operations in 2010.
 - Maximum hourly impacts are based on maximum design rate for each emission source, except for NOx. NOx emissions are based on stack testing.
 - Maximum hourly and annual average emissions are based on information provided in Attachment 3 Revised Addendum and Attachment 3A, respectively.
 - N/A - No standard for averaging period.
 - "----" No AGS/SGS values for compound.
 - Gray shading indicates modeled impact exceed an Annual Guideline Concentration (AGC).
 - Changes to the TLV and TWA values for naphthalene, nitrogen dioxide and manganese are currently being considered by American Conference of Governmental Industrial Hygienists (ACGIH). Changes are not anticipated to affect the AGC or SGC values until 2013.
 *AGC and SGC values for Dichlorobenzene have been taken from the lowest guideline value from dichlorobenzene, o-, dichlorobenzene, m- and dichlorobenzene, p-.

08/24/11

11:56:52

*** SCREEN3 MODEL RUN ***
*** VERSION DATED 96043 ***

ASRC Impact @ 76 082411

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	1.00000
STACK HEIGHT (M)	=	45.7200
STK INSIDE DIAM (M)	=	2.1082
STK EXIT VELOCITY (M/S)	=	8.4800
STK GAS EXIT TEMP (K)	=	422.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	76.0000
URBAN/RURAL OPTION	=	URBAN
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 28.245 M**4/S**3; MOM. FLUX = 55.477 M**4/S**2.

*** FULL METEOROLOGY ***

*** SCREEN DISCRETE DISTANCES ***

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

DIST	CONC		U10M	USTK	MIX HT	PLUME	SIGMA	
(M)	(UG/M**3)	STAB	(M/S)	(M/S)	(M)	HT (M)	Y (M)	Z
(M) DWASH								
-----	-----	-----	-----	-----	-----	-----	-----	
396.	39.79	6	1.0	1.6	10000.0	110.24	44.47	
31.14	NO							

DWASH= MEANS NO CALC MADE (CONC = 0.0)

DWASH=NO MEANS NO BUILDING DOWNWASH USED
 DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
 DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
 DWASH=NA MEANS DOWNWASH NOT APPLICABLE, $X < 3 \cdot LB$

 * SUMMARY OF TERRAIN HEIGHTS ENTERED FOR *
 * SIMPLE ELEVATED TERRAIN PROCEDURE *

TERRAIN HT (M)	DISTANCE RANGE (M)	
-----	MINIMUM	MAXIMUM
0.	396.	--

 *** SUMMARY OF SCREEN MODEL RESULTS ***

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
-----	-----	-----	-----
SIMPLE TERRAIN	39.79	396.	0.

 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
