APPENDIX A – AIRS INFORMATION

AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

Permittee/Facility Name: **Southeast Idaho Energy, LLC (SIE) Power County Advanced Energy Center (PCAEC)**
Facility Location: **Lamb Weston Road, American Falls, Idaho 83211**
AIRS Number: **077-00029**

AIR PROGRAM POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	SM80	TITLE V	AREA CLASSIFICATION A-Attainment U-Unclassified N- Nonattainment
SO_2	B		Db				B	U
NO_x	A*	A*	Db, G, IIII				A*	U
CO	A	A	IIII				A	U
PM_{10}	SM	SM	Db, Y, IIII				SM	U
PT (Particulate)	SM	SM	Y					---
VOC	B		IIII, VVa				B	U
THAP (Total HAPs)	SM**	---						---
[redacted]								
			Db, G, Y, VVa, IIII					

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)
[b] AIRS/AFS Classification Codes:
A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For HAPs only, class "A" is applied to each pollutant which is at or above the 10 T/yr threshold, **or** each pollutant that is below the 10 T/yr threshold, but contributes to a plant total in excess of 25 T/yr of all HAPs.
SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.
B = Actual and potential emissions below all applicable major source thresholds.
C = Class is unknown.
ND = Major source thresholds are not defined (e.g., radionuclides).

* In accordance with 52.21(b)(1)(ii), a source that is PSD major for NO_x is also considered major for ozone.
** Uncontrolled emissions of all HAPs are less than 25 TPY, but uncontrolled emissions of carbonyl sulfide (COS) are greater than 10 tons per year.

Appendix B – Emissions Inventory

Emissions Unit	PM_{10}		SO_2		NOx		CO		VOC		LEAD
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	
Point Sources Affected by this Permitting Action											
Feedstock Handling: Coal, Petcoke, and Fluxant											
Railcar Unloading (SRC01)	4.35	19.05	---	---	---	---	---	---	---	---	---
Railcar Hopper to Conveyor (SCR02)	4.07	17.82	---	---	---	---	---	---	---	---	---
Railcar Conveyor to Silo Conveyor (SRC03)	4.07	17.82	---	---	---	---	---	---	---	---	---
Silo Conveyor to Stacker Conveyor (SRC04)	4.07	17.82	---	---	---	---	---	---	---	---	---
Silo 1 Vent (SRC06)	4.07	17.82	---	---	---	---	---	---	---	---	---
Silo 2 Vent (SRC07)	4.07	17.82	---	---	---	---	---	---	---	---	---
Silo 3 Vent (SRC05)	4.07	17.82	---	---	---	---	---	---	---	---	---
Silo 1 Reclaimer – Reclaim Conveyor (SRC08)	0.08	0.37	---	---	---	---	---	---	---	---	---
Silo 2 Reclaimer – Reclaim Conveyor (SRC09)	0.08	0.37	---	---	---	---	---	---	---	---	---
Silo 3 Reclaimer – Reclaim Conveyor (SRC10)	0.08	0.37	---	---	---	---	---	---	---	---	---
Reclaim Conveyor to Rod Mill Hopper #1 (SRC11)	0.08	0.37	---	---	---	---	---	---	---	---	---
Reclaim Conveyor to Rod Mill Hopper #2 (SRC12)	0.08	0.37	---	---	---	---	---	---	---	---	---
Fluxant Silo Filling	0.25	1.08									
Natural Gas-Fired Heaters											
ASU Regen Heater (SRC13)	0.0007	0.0033	0.0001	0.0003	0.005	0.021	0.008	0.036	0.001	0.005	---
Gasifier Heater Vent #1 (SRC14)	0.067	0.294	0.053	0.232	0.882	3.865	0.741	3.246	0.049	0.213	---
Gasifier Heater Vent #2 (SRC15)	0.067	0.294	0.053	0.232	0.882	3.865	0.741	3.246	0.049	0.213	---
Diesel-Fired Emergency Engine Generators											
2 MW Emergency Generator (SRC25)	0.15	0.67	0.98	4.29	31.84	139.47	1.71	7.50	0.65	2.85	
500 kW Emergency Generator (Fire Pump), (SRC26)	0.03	0.12	0.26	1.12	8.48	37.13	0.59	2.59	0.01	0.06	

Table B.1 UNCONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS

Table B.1 UNCONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS

Emissions Unit	PM_{10}		SO_2		NOx		CO		VOC		LEAD
	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	
Gaseous Fuel-Fired Boilers											
Package Boiler (SRC24)	1.25	5.48	1.43	6.26	100	438	18.50	81.03	1.00	4.38	0.0006 T/yr
Steam Superheater Boiler (SRC31)	1.25	5.48	1.43	6.26	100	438	18.50	81.03	1.00	4.38	0.0006 T/yr
Gasification Island											
Gasifier Flare (SRC16) Steady-state	0.011	0.048	0.008	0.036	0.100	0.438	0.509	2.230	0.014	0.061	---
Selexol AGR CO2 Vent (SRC17)	---	---	---	---	0.88	3.86	173.29	759.01	---	---	---
Sulfuric Acid Vent (SRC18) - Deleted from Project Scope	---	---	---	---	---	---	---	---	---	---	---
Ammonia and Urea Plants											
Process Flare (SRC21)	0.06	0.25	0.008	0.037	1.31	5.76	1.30	5.69	0.044	0.194	---
Urea Melt Plant Vent (SRC23)	---	---	---	---	---	---	---	---	---	---	---
Urea Granulation Vent (SRC19)	9.00	39.42	---	---	---	---	---	---	---	---	---
Urea Granulation Loadout	---	---	---	---	---	---	---	---	---	---	---
Nitric Acid and Ammonium Nitrate/UAN Plants											
Nitric Acid Unit – Tailgas (SRC20)	---	---	---	---	766.67	3358.00	---	---	---	---	---
Ammonium Nitrate Neutralizer Vent (SRC29)	1.49	6.52	---	---	---	---	---	---	---	---	---
Diesel, Ammonia, Nitric Acid, and UAN Tank Storage											
Ammonia Storage Flare (SRC27)	0.005	0.024	0.004	0.018	0.050	0.219	0.255	1.115	0.010	0.043	---
Process Water Cooling Towers											
Cooling Tower (SRC22)	60.53	265.13	---	---	---	---	---	---	---	---	---
ZLDS System (SRC30)	4.75	20.79	---	---	---	---	---	---	---	---	---
Total, Point Sources FINAL 2009	**108**	**473**	**4.2**	**18.5**	**1,011**	**4,429**	**216**	**947**	**2.8**	**12.4**	**0.0012 T/yr**

Table B.1 UNCONTROLLED EMISSIONS ESTIMATES OF CRITERIA POLLUTANTS											
Emissions Unit	**PM_{10}**		**SO_2**		**NOx**		**CO**		**VOC**		**LEAD**
	lb/hr	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	**lb/hr**	**T/yr**	
Process Fugitive/Volume Sources Affected by this Permitting Action											
Fluxant Handling											
Fluxant Unloading (from trucks)	0.218	0.953	---	---	---	---	---	---	---	---	---
Fluxant Hopper to Fluxant Silos	0.2034	0.8911	---	---	---	---	---	---	---	---	---
Fluxant Silos to Rod Mill Hopper	0.0085	0.0371	---	---	---	---	---	---	---	---	---
Slag Handling											
Slag Dewatering to Slag Storage Pile	0.0197	0.0861	---	---	---	---	---	---	---	---	---
Slag Storage Pile	0.0785	0.3437	---	---	---	---	---	---	---	---	---
Slag Storage Truck Loading	0.0197	0.0861	---	---	---	---	---	---	---	---	---
Gasification and Syngas Cleanup Process Fugitives											
Valves – gas	---	---	---	---	---	---	3.43	15.03	---	---	---
Valves – Lt Liquid	---	---	---	---	---	---	0.032	0.139	---	---	---
Pump Seals – Lt Liquid	---	---	---	---	---	---	0.00	0.00	---	---	---
Compressor Seals	---	---	---	---	---	---	1.80	7.86	---	---	---
Pressure Relief Valves	---	---	---	---	---	---	0.66	2.87	---	---	---
Connectors	---	---	---	---	---	---	1.10	4.83	---	---	---
Open-Ended Lines	---	---	---	---	---	---	0.007	0.03	---	---	---
Sampling Connections	---	---	---	---	---	---	0.06	0.26	---	---	---
Ammonia, Urea, and UAN Process Fugitives											
Valves – gas	---	---	---	---	---	---	---	---	---	---	---
Valves – Lt Liquid	---	---	---	---	---	---	---	---	---	---	---
Pump Seals – Lt Liquid	---	---	---	---	---	---	---	---	---	---	---
Compressor Seals	---	---	---	---	---	---	---	---	---	---	---
Pressure Relief Valves	---	---	---	---	---	---	---	---	---	---	---
Connectors	---	---	---	---	---	---	---	---	---	---	---
Open-Ended Lines	---	---	---	---	---	---	---	---	---	---	---
Sampling Connections	---	---	---	---	---	---	---	---	---	---	---
Fuel Storage Tanks											
2 MW Generator Diesel Tank (TNK19)	---	---	---	---	---	---	---	---	2.4E-05	1.1E-04	---
500 kW Generator Diesel Tank (TNK18)	---	---	---	---	---	---	---	---	2.4E-05	1.1E-04	---
Total Fugitives FINAL 2009	**0.55**	**2.40**	**---**	**---**	**---**	**---**	**7.08**	**31.0**	**4.8E-05**	**2.2E-04**	**---**
Uncontrolled Emissions from Sources Affected by this Permitting Action											
TOTAL, FINAL 2009	**109**	**476**	**4.2**	**18.5**	**1,011**	**4,429**	**223**	**978**	**2.8**	**12.4**	**0.0012 T/yr**

"---" = pollutant is not emitted or is emitted in negligible amounts

Table B.2 UNCONTROLLED EMISSIONS OF HAZARDOUS AIR POLLUTANTS
Text shown in red denotes DEQ revisions to the applicant's April 2008 submittal based on Application Addenda Nos. 1 – 4.

Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1. Source Name	Pollutant	2. Source ID	3. lb/hr	T/yr	4. EL (lb/hr)
ASU Regen Heater	2-Methylnaphthalene	SRC13	2.35E-09	1.03E-08	
Gasifier Heater Vent #1	2-Methylnaphthalene	SRC14	2.12E-07	9.28E-07	
Gasifier Heater Vent #2	2-Methylnaphthalene	SRC15	2.12E-07	9.28E-07	
Gasifier Flare	2-Methylnaphthalene	SRC16	3.53E-08	1.55E-07	
Process Flare	2-Methylnaphthalene	SRC21	3.53E-08	1.55E-07	Polycyclic Organic Matter (POM)
Package Boiler	2-Methylnaphthalene	SRC24	5.88E-06	2.58E-05	
Ammonia Storage Flare	2-Methylnaphthalene	SRC27	1.76E-08	7.73E-08	This is a PAH HAP (POM)
Total			6.40E-06	2.80E-05	-
2 MW Emergency Generator	Acetaldehyde	SRC25	4.87E-04	2.13E-03	
500 KW Emergency Firewater Pump	Acetaldehyde	SRC26	1.28E-04	5.62E-04	
Total			6.15E-04	2.69E-03	3.00E-03
2 MW Emergency Generator	Acrolein	SRC25	1.52E-04	6.66E-04	
500 KW Emergency Firewater Pump	Acrolein	SRC26	4.01E-05	1.76E-04	
Total			1.92E-04	8.42E-04	1.70E-02
ASU Regen Heater	Arsenic	SRC13	1.96E-08	8.59E-08	
Gasifier Heater Vent #1	Arsenic	SRC14	1.76E-06	7.73E-06	
Gasifier Heater Vent #2	Arsenic	SRC15	1.76E-06	7.73E-06	
Gasifier Flare	Arsenic	SRC16	2.94E-07	1.29E-06	
Process Flare	Arsenic	SRC21	2.94E-07	1.29E-06	
Package Boiler	Arsenic	SRC24	4.90E-05	2.15E-04	
Ammonia Storage Flare	Arsenic	SRC27	1.47E-07	6.44E-07	
Total			5.33E-05	2.33E-04	1.50E-06
ASU Regen Heater	Benzene	SRC13	2.06E-07	9.02E-07	
Gasifier Heater Vent #1	Benzene	SRC14	1.85E-05	8.12E-05	
Gasifier Heater Vent #2	Benzene	SRC15	1.85E-05	8.12E-05	
Gasifier Flare	Benzene	SRC16	3.09E-06	1.35E-05	
Process Flare	Benzene	SRC21	3.09E-06	1.35E-05	
Package Boiler	Benzene	SRC24	5.15E-04	2.25E-03	
2 MW Emergency Generator	Benzene	SRC25	1.50E-02	6.56E-02	
500 KW Emergency Firewater Pump	Benzene	SRC26	3.95E-03	1.73E-02	
Ammonia Storage Flare	Benzene	SRC27	1.54E-06	6.76E-06	
Total			1.95E-02	8.54E-02	8.00E-04
ASU Regen Heater	Cadmium	SRC13	1.08E-07	4.72E-07	
Gasifier Heater Vent #1	Cadmium	SRC14	9.71E-06	4.25E-05	
Gasifier Heater Vent #2	Cadmium	SRC15	9.71E-06	4.25E-05	
Gasifier Flare	Cadmium	SRC16	1.62E-06	7.09E-06	
Process Flare	Cadmium	SRC21	1.62E-06	7.09E-06	
Package Boiler	Cadmium	SRC24	2.70E-04	1.18E-03	
Ammonia Storage Flare	Cadmium	SRC27	8.09E-07	3.54E-06	
Total			2.93E-04	1.28E-03	3.70E-06
ASU Regen Heater	Chromium	SRC13	1.37E-07	6.01E-07	
Gasifier Heater Vent #1	Chromium	SRC14	1.24E-05	5.41E-05	
Gasifier Heater Vent #2	Chromium	SRC15	1.24E-05	5.41E-05	
Gasifier Flare	Chromium	SRC16	2.06E-06	9.02E-06	
Process Flare	Chromium	SRC21	2.06E-06	9.02E-06	
Package Boiler	Chromium	SRC24	3.43E-04	1.50E-03	
Ammonia Storage Flare	Chromium	SRC27	1.03E-06	4.51E-06	
Total			3.73E-04	1.63E-03	3.30E-02
ASU Regen Heater	Cobalt	SRC13	8.24E-09	3.61E-08	
Gasifier Heater Vent #1	Cobalt	SRC14	7.41E-07	3.25E-06	
Gasifier Heater Vent #2	Cobalt	SRC15	7.41E-07	3.25E-06	
Gasifier Flare	Cobalt	SRC16	1.24E-07	5.41E-07	
Process Flare	Cobalt	SRC21	1.24E-07	5.41E-07	
Package Boiler	Cobalt	SRC24	2.06E-05	9.02E-05	
Ammonia Storage Flare	Cobalt	SRC27	6.18E-08	2.71E-07	
Total			2.24E-05	9.81E-05	3.30E-03
Selexol AGR CO2 Vent	COS	SRC17	3.72E+00	1.63E+01	
Total			3.72E+00	1.63E+01	2.70E-02
ASU Regen Heater	Dichlorobenzene	SRC13	1.18E-07	5.15E-07	
Gasifier Heater Vent #1	Dichlorobenzene	SRC14	1.06E-05	4.64E-05	

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Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1. Source Name	Pollutant	2. Source ID	3. lb/hr	T/yr	4. EL (lb/hr)
Gasifier Heater Vent #2	Dichlorobenzene	SRC15	1.06E-05	4.64E-05	
Gasifier Flare	Dichlorobenzene	SRC16	1.76E-06	7.73E-06	
Process Flare	Dichlorobenzene	SRC21	1.76E-06	7.73E-06	
Package Boiler	Dichlorobenzene	SRC24	2.94E-04	1.29E-03	
Ammonia Storage Flare	Dichlorobenzene	SRC27	8.82E-07	3.86E-06	
Total			3.20E-04	1.40E-03	2.00E+01
ASU Regen Heater	Flouranthene	SRC13	3.00E-10	1.31E-09	
Gasifier Heater Vent #1	Flouranthene	SRC14	2.70E-08	1.18E-07	
Gasifier Heater Vent #2	Flouranthene	SRC15	2.70E-08	1.18E-07	
Gasifier Flare	Flouranthene	SRC16	4.50E-09	1.97E-08	
Process Flare	Flouranthene	SRC21	4.50E-09	1.97E-08	
Package Boiler	Flouranthene	SRC24	7.50E-07	3.29E-06	POM: Fluoranthene is a
Ammonia Storage Flare	Flouranthene	SRC27	2.25E-09	9.86E-09	15-PAH Group HAP
Total			8.16E-07	3.57E-06	-
ASU Regen Heater	Flourene	SRC13	2.75E-10	1.20E-09	
Gasifier Heater Vent #1	Flourene	SRC14	2.47E-08	1.08E-07	
Gasifier Heater Vent #2	Flourene	SRC15	2.47E-08	1.08E-07	
Gasifier Flare	Flourene	SRC16	4.12E-09	1.80E-08	
Process Flare	Flourene	SRC21	4.12E-09	1.80E-08	
Package Boiler	Flourene	SRC24	6.86E-07	3.01E-06	POM: Fluorene is
Ammonia Storage Flare	Flourene	SRC27	2.06E-09	9.02E-09	a 15-PAH Group HAP
Total			7.46E-07	3.27E-06	-
ASU Regen Heater	Formaldehyde	SRC13	7.35E-06	3.22E-05	
Gasifier Heater Vent #1	Formaldehyde	SRC14	6.62E-04	2.90E-03	
Gasifier Heater Vent #2	Formaldehyde	SRC15	6.62E-04	2.90E-03	
Gasifier Flare	Formaldehyde	SRC16	1.10E-04	4.83E-04	
Process Flare	Formaldehyde	SRC21	1.10E-04	4.83E-04	
Package Boiler	Formaldehyde	SRC24	1.84E-02	8.05E-02	
2 MW Emergency Generator	Formaldehyde	SRC25	1.52E-03	6.67E-03	
500 KW Emergency Firewater Pump	Formaldehyde	SRC26	4.01E-04	1.76E-03	
Ammonia Storage Flare	Formaldehyde	SRC27	5.51E-05	2.42E-04	
Total			2.19E-02	9.60E-02	5.10E-04
Selexol AGR CO2 Vent	H_2S	SRC17	2.34E-01	1.03E+00	
Sulfuric Acid Vent	H_2S	SRC18			NOT HAP
Process Fugitives	H_2S	---	2.02E-01	8.86E-01	
Total			4.37E-01	1.91E+00	9.33E-01
Sulfuric Acid Vent	H_2SO_4	SRC18			NOT HAP
Total			0.00E+00	0.00E+00	6.70E-02
ASU Regen Heater	Hexane	SRC13	1.76E-04	7.73E-04	
Gasifier Heater Vent #1	Hexane	SRC14	1.59E-02	6.96E-02	
Gasifier Heater Vent #2	Hexane	SRC15	1.59E-02	6.96E-02	
Gasifier Flare	Hexane	SRC16	2.65E-03	1.16E-02	
Process Flare	Hexane	SRC21	2.65E-03	1.16E-02	
Package Boiler	Hexane	SRC24	4.41E-01	1.93E+00	
Ammonia Storage Flare	Hexane	SRC27	1.32E-03	5.80E-03	
Total			4.80E-01	2.10E+00	1.20E+01
Nitric Acid Unit - Tail Gas	HNO_3	SRC20	4.36E-01	1.91E+00	
AN Neutralizer Vent	HNO_3	SRC29	5.00E-01	2.19E+00	NOT HAP
Total			9.36E-01	4.10E+00	3.33E-01
ASU Regen Heater	Lead	SRC13	4.90E-08	2.15E-07	
Gasifier Heater Vent #1	Lead	SRC14	4.41E-06	1.93E-05	
Gasifier Heater Vent #2	Lead	SRC15	4.41E-06	1.93E-05	
Gasifier Flare	Lead	SRC16	7.35E-07	3.22E-06	
Process Flare	Lead	SRC21	7.35E-07	3.22E-06	
Package Boiler	Lead	SRC24	1.23E-04	5.37E-04	
Ammonia Storage Flare	Lead	SRC27	3.68E-07	1.61E-06	
Total			1.33E-04	5.84E-04	-
ASU Regen Heater	Manganese	SRC13	3.73E-08	1.63E-07	

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Table B.2 UNCONTROLLED EMISSIONS OF HAZARDOUS AIR POLLUTANTS

Text shown in red denotes DEQ revisions to the applicant's April 2008 submittal based on Application Addenda Nos. 1 – 4

Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1.		2.	3.		4.
Source Name	Pollutant	Source ID	lb/hr	T/yr	EL (lb/hr)
Gasifier Heater Vent #1	Manganese	SRC14	3.35E-06	1.47E-05	
Gasifier Heater Vent #2	Manganese	SRC15	3.35E-06	1.47E-05	
Gasifier Flare	Manganese	SRC16	5.59E-07	2.45E-06	
Process Flare	Manganese	SRC21	5.59E-07	2.45E-06	
Package Boiler	Manganese	SRC24	9.31E-05	4.08E-04	
Ammonia Storage Flare	Manganese	SRC27	2.79E-07	1.22E-06	
Total			1.01E-04	4.44E-04	6.70E-02
ASU Regen Heater	Mercury	SRC13	2.55E-08	1.12E-07	
Gasifier Heater Vent #1	Mercury	SRC14	2.29E-06	1.00E-05	
Gasifier Heater Vent #2	Mercury	SRC15	2.29E-06	1.00E-05	
Gasifier Flare	Mercury	SRC16	3.82E-07	1.67E-06	
Process Flare	Mercury	SRC21	3.82E-07	1.67E-06	
Package Boiler	Mercury	SRC24	6.37E-05	2.79E-04	
Ammonia Storage Flare	Mercury	SRC27	1.91E-07	8.37E-07	
Total			6.93E-05	3.04E-04	1.00E-03
ASU Regen Heater	Naphthalene	SRC13	5.98E-08	2.62E-07	
Gasifier Heater Vent #1	Naphthalene	SRC14	5.38E-06	2.36E-05	
Gasifier Heater Vent #2	Naphthalene	SRC15	5.38E-06	2.36E-05	
Gasifier Flare	Naphthalene	SRC16	8.97E-07	3.93E-06	
Process Flare	Naphthalene	SRC21	8.97E-07	3.93E-06	
Package Boiler	Naphthalene	SRC24	1.50E-04	6.55E-04	
2 MW Emergency Generator	Naphthalene	SRC25	2.51E-03	1.10E-02	
500 KW Emergency Firewater Pump	Naphthalene	SRC26	6.61E-04	2.90E-03	
Ammonia Storage Flare	Naphthalene	SRC27	4.49E-07	1.96E-06	
Total			3.33E-03	1.46E-02	3.33E+00
Sulfuric Acid Vent	NH_3	SRC18			
Urea Granulation Vent	NH_3	SRC19	7.71E+01	3.38E+02	
Nitric Acid Unit - Tail Gas	NH_3	SRC20	2.19E+00	9.59E+00	
AN Neutralizer Vent	NH_3	SRC29	2.38E+01	1.04E+02	
Urea Melt Plant Vent	NH3	SRC23	3.02E+01	1.32E+02	
Process Flare	NH_3	SRC21	4.36E+00	1.91E+01	NOT HAP
Total			1.38E+02	6.03E+02	1.20E+00
ASU Regen Heater	Nickel	SRC13	2.06E-07	9.02E-07	
Gasifier Heater Vent #1	Nickel	SRC14	1.85E-05	8.12E-05	
Gasifier Heater Vent #2	Nickel	SRC15	1.85E-05	8.12E-05	
Gasifier Flare	Nickel	SRC16	3.09E-06	1.35E-05	
Process Flare	Nickel	SRC21	3.09E-06	1.35E-05	
Package Boiler	Nickel	SRC24	5.15E-04	2.25E-03	
Ammonia Storage Flare	Nickel	SRC27	1.54E-06	6.76E-06	
Total			5.60E-04	2.45E-03	2.70E-05
2 MW Emergency Generator	PAH	SRC25	4.09E-03	1.79E-02	PAHs are a subset of POM
500 KW Emergency Firewater Pump	PAH	SRC26	1.08E-03	4.72E-03	
Total			5.17E-03	2.27E-02	9.10E-05
ASU Regen Heater	Phenanathrene	SRC13	1.67E-09	7.30E-09	PAHs are a subset of POM
Gasifier Heater Vent #1	Phenanathrene	SRC14	1.50E-07	6.57E-07	
Gasifier Heater Vent #2	Phenanathrene	SRC15	1.50E-07	6.57E-07	
Gasifier Flare	Phenanathrene	SRC16	2.50E-08	1.10E-07	Natural gas emissions are
Process Flare	Phenanathrene	SRC21	2.50E-08	1.10E-07	phenanthrene,
Package Boiler	Phenanathrene	SRC24	4.17E-06	1.83E-05	not phenananthrene
Ammonia Storage Flare	Phenanathrene	SRC27	1.25E-08	5.48E-08	POM: Phenanthrene is a PAH
Total			4.53E-06	1.98E-05	-
ASU Regen Heater	Pyrene	SRC13	4.90E-10	2.15E-09	
Gasifier Heater Vent #1	Pyrene	SRC14	4.41E-08	1.93E-07	
Gasifier Heater Vent #2	Pyrene	SRC15	4.41E-08	1.93E-07	
Gasifier Flare	Pyrene	SRC16	7.35E-09	3.22E-08	
Process Flare	Pyrene	SRC21	7.35E-09	3.22E-08	
Package Boiler	Pyrene	SRC24	1.23E-06	5.37E-06	
Ammonia Storage Flare	Pyrene	SRC27	3.68E-09	1.61E-08	POM: Pyrene is a PAH HAP

SOUTHEAST IDAHO ENERGY, LLC - P-2008.0066 APP Emissions Characterization - Steady State Operations - FINAL 2009 DEQ UNCONTROLLED.XLS TAP Comparison

Table B.2 UNCONTROLLED EMISSIONS OF HAZARDOUS AIR POLLUTANTS
Text shown in red denotes DEQ revisions to the applicant's April 2008 submittal based on Application Addenda Nos. 1 – 4.

Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1.		2.	3.		4.
Source Name	Pollutant	Source ID	lb/hr	T/yr	EL (lb/hr)
Total			1.33E-06	5.84E-06	-
ASU Regen Heater	Toluene	SRC13	3.33E-07	1.46E-06	
Gasifier Heater Vent #1	Toluene	SRC14	3.00E-05	1.31E-04	
Gasifier Heater Vent #2	Toluene	SRC15	3.00E-05	1.31E-04	
Gasifier Flare	Toluene	SRC16	5.00E-06	2.19E-05	
Process Flare	Toluene	SRC21	5.00E-06	2.19E-05	
Package Boiler	Toluene	SRC24	8.33E-04	3.65E-03	
2 MW Emergency Generator	Toluene	SRC25	5.43E-03	2.38E-02	
500 KW Emergency Firewater Pump	Toluene	SRC26	1.43E-03	6.26E-03	
Ammonia Storage Flare	Toluene	SRC27	2.50E-06	1.10E-05	
Total			7.76E-03	3.40E-02	2.50E+01
2 MW Emergency Generator	Xylene	SRC25	3.73E-03	1.63E-02	
500 KW Emergency Firewater Pump	Xylene	SRC26	9.82E-04	4.30E-03	
Total			4.71E-03	2.06E-02	2.90E+01

TOTAL UNCONTROLLED HAPS = 18.66 TPY

SOUTHEAST IDAHO ENERGY, LLC - P-2008.0066 APP Emissions Characterization - Steady State Operations - FINAL 2009 DEQ UNCONTROLLED.XLS TAP Comparison

Emissions Characterization - Steady State Operation

POINT SOURCE STACK PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	.7	8.	9.	10.	NOTES
Emissions units	Stack ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Modeled Diameter (m)	Stack Exit Temperature (K)	Stack Exit Flowrate (acfm)	Stack Exit Velocity (m/s)	Stack orientation (e.g., horizontal, rain cap)	
Point Source(s)											
ASU Regen Heater	SRC13	343,957	4,735,055	1,337	4.00	0.05	355	37	9.0	Vert	
Gasifier Heater Vent #1	SRC14	343,811	4,735,195	1,337	51.82	0.5	811	5,309	15.3	Vert	
Gasifier Heater Vent #2	SRC15	343,835	4,735,206	1,337	51.82	0.5	811	5,309	15.3	Vert	
Gasifier Flare	SRC16	343,625	4,734,937	1,337	65.00	0.28	1,273	182	20.0	Vert	(5)(8)
Selexol AGR CO2 Vent	SRC17	343,780	4,735,274	1,337	52.00	1.34	359	54,000	18.0	Vert	(5)(6)
Sulfuric Acid Vent	SRC18	343,887	4,735,339	1,337	50.00	1.91	419	109,000	18.0	Vert	(5)
Urea Granulation Vent	SRC19	343,685	4,735,518	1,337	39.62	1.83	323	296,514	53.3	Vert	(11)
Nitric Acid Unit - Tail Gas	SRC20	343,789	4,735,469	1,337	57.91	1.16	400	60,500	27.1	Vert	(11)
Process Flare	SRC21	344,059	4,735,523	1,337	52.00	0.43	1,273	252	20.0	Vert	(5)(8)
Cooling Tower	SRC22	343,961	4,735,484	1,337	13.23	22.6	303	1,289,000	8.3	Vert	(7)
Urea Melt Plant Vent	SRC23	343,728	4,735,455	1,337	33.54	1.22	318	136,893	55.3	Vert	(11)
Package Boiler	SRC24	343,893	4,735,282	1,337	33.50	1.8	422	52,282	10.3	Vert	(3)
2 MW Emergency Generator	SRC25	343,876	4,735,281	1,337	10.06	0.6	679	15,136	24.5	Vert	(4)
500 KW Emergency Firewater Pump	SRC26	343,901	4,735,571	1,337	4.57	0.3	779	3,842	24.9	Vert	(4)
Ammonia Storage Flare	SRC27	343,465	4,735,159	1,337	18.29	0.20	1,273	129	20.0	Vert	(5)(8)
AN Neutralizer Vent	SRC29	343,775	4,735,526	1,337	16.46	0.3	344	14,123	91.4	Vert	(11)
ZLD System	SRC30	343,959	4,735,679	1,337	7.62	2.3	317	235,604	27.1	Vert	(10)

Notes:

1) reserved
2) reserved
3) Package Boiler Stack and Emission Parameters Based on data obtained from the Mesaba Energy Project - Application for Authorization to Construct
4) Operating Data from Caterpillar
5) Operating Data From Worley Parsons and Vendor Data
6) Incorporates CMS Thermal Oxidizer Charge Heater
7) Cooling Tower Performance from site specific study performed by SPX Cooling Technologies
8) Modeling Parameters as Specified in TCEQ Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers
9) Data scaled from similar project data
10) Estimate based on evaporating cooling tower blowdown and other process wastestreams
11) Data from KBR

Emissions Characterization - Steady State Operation

SUMMARY OF EMISSIONS - POINT SOURCES

1.	2.	3. PM$_{10}$		SO$_2$		NO$_x$		CO		VOC		Lead		NOTES
Emissions units	Stack ID	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	
Point Source(s)														
ASU Regen Heater	SRC13	0.001	0.003	0.000	0.000	0.005	0.021	0.008	0.036	0.001	0.005	0.000	0.000	(1)
Gasifier Heater Vent #1	SRC14	0.067	0.294	0.053	0.232	0.882	3.865	0.741	3.246	0.049	0.213	0.000	0.000	(1)
Gasifier Heater Vent #2	SRC15	0.067	0.294	0.053	0.232	0.882	3.865	0.741	3.246	0.049	0.213	0.000	0.000	(1)
Gasifier Flare	SRC16	0.011	0.048	0.008	0.036	0.100	0.438	0.509	2.230	0.014	0.061	0.000	0.000	(6)(8)
Selexol AGR CO2 Vent	SRC17	-	-	3.765	16.490	0.882	3.865	8.664	37.950	-	-	-	-	(6)(7)(13)
Sulfuric Acid Vent	SRC18	-	-	-	-	-	-	-	-	-	-	-	-	(6)(15)
Urea Granulation Vent	SRC19	9.000	39.420	-	-	-	-	-	-	-	-	-	-	(6)(12)
Nitric Acid Unit - Tail Gas	SRC20	-	-	-	-	15.333	67.160	-	-	-	-	-	-	(6)
Process Flare	SRC21	0.058	0.254	0.008	0.037	1.315	5.758	1.299	5.689	0.044	0.194	0.000	0.000	(6)(8)
Cooling Tower	SRC22	1.513	6.628											(10)(14)
Urea Melt Plant Vent	SRC23													(6)
Package Boiler	SRC24	1.250	5.475	1.430	6.263	5.000	21.900	18.500	81.030	1.000	4.380	0.000	0.001	(2)(11)
2 MW Emergency Generator	SRC25	0.154	0.008	0.979	0.049	31.841	1.592	1.713	0.086	0.650	0.032	0.000	0.000	(3)
500 KW Emergency Firewater Pump	SRC26	0.027	0.001	0.256	0.013	8.477	0.424	0.591	0.030	0.015	0.001	0.000	0.000	(4)
Ammonia Storage Flare	SRC27	0.005	0.024	0.004	0.018	0.050	0.219	0.255	1.115	0.010	0.043	0.000	0.000	(6)(8)
AN Neutralizer Vent	SRC29	1.490	6.520											
ZLD System	SRC30	0.246	1.078											(9)
Total FINAL 2009		**13.89**	**60.05**	**6.56**	**23.37**	**64.77**	**109.11**	**33.02**	**134.66**	**1.83**	**5.14**	**0.00**	**0.00**	
Total SIE April 2008 Appl.		**15.4**	**66.67**	**8.59**	**32.28**	**68.78**	**126.67**	**48.52**	**202.55**	**1.83**	**5.14**	**0.00**	**0.00**	

Notes:

1) Emissions Calculated using AP-42 Emission Factors - Chapter 1.4 Natural Gas Combustion
2) Package Boiler Stack and Emission Parameters Based on data obtained from the Mesaba Energy Project - Application for Authorization to Construct
3) Criteria Pollutants based on Caterpillar Vendor Data
4) Criteria Pollutants based on Caterpillar Vendor Data
5) Package Boiler Stack and Emission Parameters Based on data obtained from the Mesaba Energy Project - Application for Authorization to Construct
6) Emissions Data From Worley Parsons and Vendor Data
7) Incorporates CMS Thermal Oxidizer Charge Heater
8) Emission Estimates from TCEQ Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers
9) Estimate based on permitted facility in Louisiana
10) Operating Data from SPX Site Specific Cooling Tower Study
11) NOx Emissions assume Flue-Gas Recirculation
12) PM Controlled by Wet Scrubber
13) **Thermal Oxidizer DRE increased from 90% to 95% in Application Addendum No. 4**
14) **Drift/Mist eliminator efficiency increased from 0.001% of total flow to 0.0005% in Application Addendum No. 1**
15) **The sulfuric acid plant was deleted from the project scope in Application Addendum No. 3.**

Emissions Characterization - Steady State Operation

SUMMARY OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1. Source Name	Pollutant	2. Source ID	3. lb/hr	3. T/yr	Notes
ASU Regen Heater	2-Methylnaphthalene	SRC13	2.35E-09	1.03E-08	
ASU Regen Heater	Arsenic	SRC13	1.96E-08	8.59E-08	
ASU Regen Heater	Benzene	SRC13	2.06E-07	9.02E-07	
ASU Regen Heater	Cadmium	SRC13	1.08E-07	4.72E-07	
ASU Regen Heater	Chromium	SRC13	1.37E-07	6.01E-07	
ASU Regen Heater	Cobalt	SRC13	8.24E-09	3.61E-08	
ASU Regen Heater	Dichlorobenzene	SRC13	1.18E-07	5.15E-07	
ASU Regen Heater	Flouranthene	SRC13	3.00E-10	1.31E-09	
ASU Regen Heater	Flourene	SRC13	2.75E-10	1.20E-09	
ASU Regen Heater	Formaldehyde	SRC13	7.35E-06	3.22E-05	
ASU Regen Heater	Hexane	SRC13	1.76E-04	7.73E-04	
ASU Regen Heater	Lead	SRC13	4.90E-08	2.15E-07	
ASU Regen Heater	Manganese	SRC13	3.73E-08	1.63E-07	
ASU Regen Heater	Mercury	SRC13	2.55E-08	1.12E-07	
ASU Regen Heater	Naphthalene	SRC13	5.98E-08	2.62E-07	
ASU Regen Heater	Nickel	SRC13	2.06E-07	9.02E-07	
ASU Regen Heater	Phenanathrene	SRC13	1.67E-09	7.30E-09	
ASU Regen Heater	Pyrene	SRC13	4.90E-10	2.15E-09	
ASU Regen Heater	Toluene	SRC13	3.33E-07	1.46E-06	
Gasifier Heater Vent #1	2-Methylnaphthalene	SRC14	2.12E-07	9.28E-07	
Gasifier Heater Vent #1	Arsenic	SRC14	1.76E-06	7.73E-06	
Gasifier Heater Vent #1	Benzene	SRC14	1.85E-05	8.12E-05	
Gasifier Heater Vent #1	Cadmium	SRC14	9.71E-06	4.25E-05	
Gasifier Heater Vent #1	Chromium	SRC14	1.24E-05	5.41E-05	
Gasifier Heater Vent #1	Cobalt	SRC14	7.41E-07	3.25E-06	
Gasifier Heater Vent #1	Dichlorobenzene	SRC14	1.06E-05	4.64E-05	
Gasifier Heater Vent #1	Flouranthene	SRC14	2.70E-08	1.18E-07	
Gasifier Heater Vent #1	Flourene	SRC14	2.47E-08	1.08E-07	
Gasifier Heater Vent #1	Formaldehyde	SRC14	6.62E-04	2.90E-03	
Gasifier Heater Vent #1	Hexane	SRC14	1.59E-02	6.96E-02	
Gasifier Heater Vent #1	Lead	SRC14	4.41E-06	1.93E-05	
Gasifier Heater Vent #1	Manganese	SRC14	3.35E-06	1.47E-05	
Gasifier Heater Vent #1	Mercury	SRC14	2.29E-06	1.00E-05	
Gasifier Heater Vent #1	Naphthalene	SRC14	5.38E-06	2.36E-05	
Gasifier Heater Vent #1	Nickel	SRC14	1.85E-05	8.12E-05	
Gasifier Heater Vent #1	Phenanathrene	SRC14	1.50E-07	6.57E-07	
Gasifier Heater Vent #1	Pyrene	SRC14	4.41E-08	1.93E-07	
Gasifier Heater Vent #1	Toluene	SRC14	3.00E-05	1.31E-04	
Gasifier Heater Vent #2	2-Methylnaphthalene	SRC15	2.12E-07	9.28E-07	
Gasifier Heater Vent #2	Arsenic	SRC15	1.76E-06	7.73E-06	
Gasifier Heater Vent #2	Benzene	SRC15	1.85E-05	8.12E-05	
Gasifier Heater Vent #2	Cadmium	SRC15	9.71E-06	4.25E-05	
Gasifier Heater Vent #2	Chromium	SRC15	1.24E-05	5.41E-05	
Gasifier Heater Vent #2	Cobalt	SRC15	7.41E-07	3.25E-06	
Gasifier Heater Vent #2	Dichlorobenzene	SRC15	1.06E-05	4.64E-05	
Gasifier Heater Vent #2	Flouranthene	SRC15	2.70E-08	1.18E-07	
Gasifier Heater Vent #2	Flourene	SRC15	2.47E-08	1.08E-07	
Gasifier Heater Vent #2	Formaldehyde	SRC15	6.62E-04	2.90E-03	
Gasifier Heater Vent #2	Hexane	SRC15	1.59E-02	6.96E-02	
Gasifier Heater Vent #2	Lead	SRC15	4.41E-06	1.93E-05	
Gasifier Heater Vent #2	Manganese	SRC15	3.35E-06	1.47E-05	
Gasifier Heater Vent #2	Mercury	SRC15	2.29E-06	1.00E-05	
Gasifier Heater Vent #2	Naphthalene	SRC15	5.38E-06	2.36E-05	
Gasifier Heater Vent #2	Nickel	SRC15	1.85E-05	8.12E-05	
Gasifier Heater Vent #2	Phenanathrene	SRC15	1.50E-07	6.57E-07	
Gasifier Heater Vent #2	Pyrene	SRC15	4.41E-08	1.93E-07	
Gasifier Heater Vent #2	Toluene	SRC15	3.00E-05	1.31E-04	
Gasifier Flare	2-Methylnaphthalene	SRC16	3.53E-08	1.55E-07	(3)(8)
Gasifier Flare	Arsenic	SRC16	2.94E-07	1.29E-06	(3)(8)
Gasifier Flare	Benzene	SRC16	3.09E-06	1.35E-05	(3)(8)

Emissions Characterization - Steady State Operation

SUMMARY OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1.		2.	3.		Notes
Source Name	Pollutant	Source ID	lb/hr	T/yr	
Gasifier Flare	Cadmium	SRC16	1.62E-06	7.09E-06	(3)(8)
Gasifier Flare	Chromium	SRC16	2.06E-06	9.02E-06	(3)(8)
Gasifier Flare	Cobalt	SRC16	1.24E-07	5.41E-07	(3)(8)
Gasifier Flare	Dichlorobenzene	SRC16	1.76E-06	7.73E-06	(3)(8)
Gasifier Flare	Flouranthene	SRC16	4.50E-09	1.97E-08	(3)(8)
Gasifier Flare	Flourene	SRC16	4.12E-09	1.80E-08	(3)(8)
Gasifier Flare	Formaldehyde	SRC16	1.10E-04	4.83E-04	(3)(8)
Gasifier Flare	Hexane	SRC16	2.65E-03	1.16E-02	(3)(8)
Gasifier Flare	Lead	SRC16	7.35E-07	3.22E-06	(3)(8)
Gasifier Flare	Manganese	SRC16	5.59E-07	2.45E-06	(3)(8)
Gasifier Flare	Mercury	SRC16	3.82E-07	1.67E-06	(3)(8)
Gasifier Flare	Naphthalene	SRC16	8.97E-07	3.93E-06	(3)(8)
Gasifier Flare	Nickel	SRC16	3.09E-06	1.35E-05	(3)(8)
Gasifier Flare	Phenanathrene	SRC16	2.50E-08	1.10E-07	(3)(8)
Gasifier Flare	Pyrene	SRC16	7.35E-09	3.22E-08	(3)(8)
Gasifier Flare	Toluene	SRC16	5.00E-06	2.19E-05	(3)(8)
Selexol AGR CO2 Vent	H_2S	SRC17	2.34E-01	1.03E+00	(6)(7)
Selexol AGR CO2 Vent	COS	SRC17	1.86E-01	8.14E-01	(6)(7)
Sulfuric Acid Vent	H_2S	SRC18			(6)
Sulfuric Acid Vent	H_2SO_4	SRC18			(6)
Sulfuric Acid Vent	NH_3	SRC18			(6)
Urea Granulation Vent	NH_3	SRC19	7.71E+01	3.38E+02	(2)
Nitric Acid Unit - Tail Gas	NH_3	SRC20	2.19E+00	9.59E+00	(6)
Nitric Acid Unit - Tail Gas	HNO_3	SRC20	4.36E-01	1.91E+00	(6)
Process Flare	Ammonia	SRC21	4.36E+00	1.91E+01	(3)(8)
Process Flare	2-Methylnaphthalene	SRC21	3.53E-08	1.55E-07	(3)(8)
Process Flare	Arsenic	SRC21	2.94E-07	1.29E-06	(3)(8)
Process Flare	Benzene	SRC21	3.09E-06	1.35E-05	(3)(8)
Process Flare	Cadmium	SRC21	1.62E-06	7.09E-06	(3)(8)
Process Flare	Chromium	SRC21	2.06E-06	9.02E-06	(3)(8)
Process Flare	Cobalt	SRC21	1.24E-07	5.41E-07	(3)(8)
Process Flare	Dichlorobenzene	SRC21	1.76E-06	7.73E-06	(3)(8)
Process Flare	Flouranthene	SRC21	4.50E-09	1.97E-08	(3)(8)
Process Flare	Flourene	SRC21	4.12E-09	1.80E-08	(3)(8)
Process Flare	Formaldehyde	SRC21	1.10E-04	4.83E-04	(3)(8)
Process Flare	Hexane	SRC21	2.65E-03	1.16E-02	(3)(8)
Process Flare	Lead	SRC21	7.35E-07	3.22E-06	(3)(8)
Process Flare	Manganese	SRC21	5.59E-07	2.45E-06	(3)(8)
Process Flare	Mercury	SRC21	3.82E-07	1.67E-06	(3)(8)
Process Flare	Naphthalene	SRC21	8.97E-07	3.93E-06	(3)(8)
Process Flare	Nickel	SRC21	3.09E-06	1.35E-05	(3)(8)
Process Flare	Phenanathrene	SRC21	2.50E-08	1.10E-07	(3)(8)
Process Flare	Pyrene	SRC21	7.35E-09	3.22E-08	(3)(8)
Process Flare	Toluene	SRC21	5.00E-06	2.19E-05	(3)(8)
Cooling Tower		SRC22			
Urea Melt Plant Vent	NH3	SRC23	3.02E+01	1.32E+02	(2)
Package Boiler	2-Methylnaphthalene	SRC24	5.88E-06	2.58E-05	(3)
Package Boiler	Arsenic	SRC24	4.90E-05	2.15E-04	(3)
Package Boiler	Benzene	SRC24	5.15E-04	2.25E-03	(3)
Package Boiler	Cadmium	SRC24	2.70E-04	1.18E-03	(3)
Package Boiler	Chromium	SRC24	3.43E-04	1.50E-03	(3)
Package Boiler	Cobalt	SRC24	2.06E-05	9.02E-05	(3)
Package Boiler	Dichlorobenzene	SRC24	2.94E-04	1.29E-03	(3)
Package Boiler	Flouranthene	SRC24	7.50E-07	3.29E-06	(3)
Package Boiler	Flourene	SRC24	6.86E-07	3.01E-06	(3)
Package Boiler	Formaldehyde	SRC24	1.84E-02	8.05E-02	(3)
Package Boiler	Hexane	SRC24	4.41E-01	1.93E+00	(3)
Package Boiler	Lead	SRC24	1.23E-04	5.37E-04	(3)

SOUTHEAST IDAHO ENERGY, LLC - F-2008.0005 AFF Emissions Characterization - Steady State Operations - FINAL 2008 DEQ.XLS - Toxic Emissions

Emissions Characterization - Steady State Operation

SUMMARY OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1.		2.	3.		Notes
Source Name	Pollutant	Source ID	lb/hr	T/yr	
Package Boiler	Manganese	SRC24	9.31E-05	4.08E-04	(3)
Package Boiler	Mercury	SRC24	6.37E-05	2.79E-04	(3)
Package Boiler	Naphthalene	SRC24	1.50E-04	6.55E-04	(3)
Package Boiler	Nickel	SRC24	5.15E-04	2.25E-03	(3)
Package Boiler	Phenanathrene	SRC24	4.17E-06	1.83E-05	(3)
Package Boiler	Pyrene	SRC24	1.23E-06	5.37E-06	(3)
Package Boiler	Toluene	SRC24	8.33E-04	3.65E-03	(3)
2 MW Emergency Generator	Acetaldehyde	SRC25	4.87E-04	2.43E-05	(5)
2 MW Emergency Generator	Acrolein	SRC25	1.52E-04	7.61E-06	(5)
2 MW Emergency Generator	Benzene	SRC25	1.50E-02	7.49E-04	(5)
2 MW Emergency Generator	Formaldehyde	SRC25	1.52E-03	7.62E-05	(5)
2 MW Emergency Generator	Naphthalene	SRC25	2.51E-03	1.25E-04	(5)
2 MW Emergency Generator	PAH	SRC25	4.09E-03	2.05E-04	(5)
2 MW Emergency Generator	Toluene	SRC25	5.43E-03	2.71E-04	(5)
2 MW Emergency Generator	Xylene	SRC25	3.73E-03	1.86E-04	(5)
500 KW Emergency Firewater Pump	Acetaldehyde	SRC26	1.28E-04	6.41E-06	(4)
500 KW Emergency Firewater Pump	Acrolein	SRC26	4.01E-05	2.00E-06	(4)
500 KW Emergency Firewater Pump	Benzene	SRC26	3.95E-03	1.97E-04	(4)
500 KW Emergency Firewater Pump	Formaldehyde	SRC26	4.01E-04	2.01E-05	(4)
500 KW Emergency Firewater Pump	Naphthalene	SRC26	6.61E-04	3.31E-05	(4)
500 KW Emergency Firewater Pump	PAH	SRC26	1.08E-03	5.39E-05	(4)
500 KW Emergency Firewater Pump	Toluene	SRC26	1.43E-03	7.15E-05	(4)
500 KW Emergency Firewater Pump	Xylene	SRC26	9.82E-04	4.91E-05	(4)
Ammonia Storage Flare	2-Methylnaphthalene	SRC27	1.76E-08	7.73E-08	(3)(8)
Ammonia Storage Flare	Arsenic	SRC27	1.47E-07	6.44E-07	(3)(8)
Ammonia Storage Flare	Benzene	SRC27	1.54E-06	6.76E-06	(3)(8)
Ammonia Storage Flare	Cadmium	SRC27	8.09E-07	3.54E-06	(3)(8)
Ammonia Storage Flare	Chromium	SRC27	1.03E-06	4.51E-06	(3)(8)
Ammonia Storage Flare	Cobalt	SRC27	6.18E-08	2.71E-07	(3)(8)
Ammonia Storage Flare	Dichlorobenzene	SRC27	8.82E-07	3.86E-06	(3)(8)
Ammonia Storage Flare	Flouranthene	SRC27	2.25E-09	9.86E-09	(3)(8)
Ammonia Storage Flare	Flourene	SRC27	2.06E-09	9.02E-09	(3)(8)
Ammonia Storage Flare	Formaldehyde	SRC27	5.51E-05	2.42E-04	(3)(8)
Ammonia Storage Flare	Hexane	SRC27	1.32E-03	5.80E-03	(3)(8)
Ammonia Storage Flare	Lead	SRC27	3.68E-07	1.61E-06	(3)(8)
Ammonia Storage Flare	Manganese	SRC27	2.79E-07	1.22E-06	(3)(8)
Ammonia Storage Flare	Mercury	SRC27	1.91E-07	8.37E-07	(3)(8)
Ammonia Storage Flare	Naphthalene	SRC27	4.49E-07	1.96E-06	(3)(8)
Ammonia Storage Flare	Nickel	SRC27	1.54E-06	6.76E-06	(3)(8)
Ammonia Storage Flare	Phenanathrene	SRC27	1.25E-08	5.48E-08	(3)(8)
Ammonia Storage Flare	Pyrene	SRC27	3.68E-09	1.61E-08	(3)(8)
Ammonia Storage Flare	Toluene	SRC27	2.50E-06	1.10E-05	(3)(8)
AN Neutralizer Vent	NH_3	SRC29	2.38E+01	1.04E+02	(2)
AN Neutralizer Vent	HNO3	SRC29	5.00E-01	2.19E+00	(9)
ZLD System		SRC30			

Notes:

1) reserved
2) Emission Estimates from KBR
3) HAPs and TAPs emission estimates based on AP-42 Emission Factors, Chapter 1.4 - Natural Gas Combustion
4) HAPs and TAPs based on AP-42 Emission Factors, Chapter 3.4 Large Stationary Diesel and All Stationary Dual-Fuel Engines
5) HAPs and TAPs based on AP-42 Emission Factors, Chapter 3.4 Large Stationary Diesel and All Stationary Dual-Fuel Engines
6) Emissions Data From Worley Parsons and Vendor Data
7) Assumes 90% Destruction from CMS Thermal Oxidizer
8) Emission Estimates from TCEQ Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers
8) Based on CF I Permit

SOUTHEAST IDAHO ENERGY, LLC - F:2008 0066 APP Emissions Characterization - Steady State Operations - FINAL 2008 DEQ.XLS - Toxic Emissions

Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1. Source Name	Pollutant	2. Source ID	3. lb/hr	T/yr	4. EL (lb/hr)
ASU Regen Heater	2-Methylnaphthalene	SRC13	2.35E-09	1.03E-08	
Gasifier Heater Vent #1	2-Methylnaphthalene	SRC14	2.12E-07	9.28E-07	
Gasifier Heater Vent #2	2-Methylnaphthalene	SRC15	2.12E-07	9.28E-07	
Gasifier Flare	2-Methylnaphthalene	SRC16	3.53E-08	1.55E-07	
Process Flare	2-Methylnaphthalene	SRC21	3.53E-08	1.55E-07	Polycyclic Organic Matter (POM)
Package Boiler	2-Methylnaphthalene	SRC24	5.88E-06	2.58E-05	
Ammonia Storage Flare	2-Methylnaphthalene	SRC27	1.76E-08	7.73E-08	This is a PAH HAP (POM)
Total			6.40E-06	2.80E-05	-
2 MW Emergency Generator	Acetaldehyde	SRC25	4.87E-04	2.43E-05	
500 KW Emergency Firewater Pump	Acetaldehyde	SRC26	1.28E-04	6.41E-06	
Total			6.15E-04	3.07E-05	3.00E-03
2 MW Emergency Generator	Acrolein	SRC25	1.52E-04	7.61E-06	
500 KW Emergency Firewater Pump	Acrolein	SRC26	4.01E-05	2.00E-06	
Total			1.92E-04	9.61E-06	1.70E-02
ASU Regen Heater	Arsenic	SRC13	1.96E-08	8.59E-08	
Gasifier Heater Vent #1	Arsenic	SRC14	1.76E-06	7.73E-06	
Gasifier Heater Vent #2	Arsenic	SRC15	1.76E-06	7.73E-06	
Gasifier Flare	Arsenic	SRC16	2.94E-07	1.29E-06	
Process Flare	Arsenic	SRC21	2.94E-07	1.29E-06	
Package Boiler	Arsenic	SRC24	4.90E-05	2.15E-04	
Ammonia Storage Flare	Arsenic	SRC27	1.47E-07	6.44E-07	
Total			5.33E-05	2.33E-04	1.50E-06
ASU Regen Heater	Benzene	SRC13	2.06E-07	9.02E-07	
Gasifier Heater Vent #1	Benzene	SRC14	1.85E-05	8.12E-05	
Gasifier Heater Vent #2	Benzene	SRC15	1.85E-05	8.12E-05	
Gasifier Flare	Benzene	SRC16	3.09E-06	1.35E-05	
Process Flare	Benzene	SRC21	3.09E-06	1.35E-05	
Package Boiler	Benzene	SRC24	5.15E-04	2.25E-03	
2 MW Emergency Generator	Benzene	SRC25	1.50E-02	7.49E-04	
500 KW Emergency Firewater Pump	Benzene	SRC26	3.95E-03	1.97E-04	
Ammonia Storage Flare	Benzene	SRC27	1.54E-06	6.76E-06	
Total			1.95E-02	3.40E-03	8.00E-04
ASU Regen Heater	Cadmium	SRC13	1.08E-07	4.72E-07	
Gasifier Heater Vent #1	Cadmium	SRC14	9.71E-06	4.25E-05	
Gasifier Heater Vent #2	Cadmium	SRC15	9.71E-06	4.25E-05	
Gasifier Flare	Cadmium	SRC16	1.62E-06	7.09E-06	
Process Flare	Cadmium	SRC21	1.62E-06	7.09E-06	
Package Boiler	Cadmium	SRC24	2.70E-04	1.18E-03	
Ammonia Storage Flare	Cadmium	SRC27	8.09E-07	3.54E-06	
Total			2.93E-04	1.28E-03	3.70E-06
ASU Regen Heater	Chromium	SRC13	1.37E-07	6.01E-07	
Gasifier Heater Vent #1	Chromium	SRC14	1.24E-05	5.41E-05	
Gasifier Heater Vent #2	Chromium	SRC15	1.24E-05	5.41E-05	
Gasifier Flare	Chromium	SRC16	2.06E-06	9.02E-06	
Process Flare	Chromium	SRC21	2.06E-06	9.02E-06	
Package Boiler	Chromium	SRC24	3.43E-04	1.50E-03	
Ammonia Storage Flare	Chromium	SRC27	1.03E-06	4.51E-06	
Total			3.73E-04	1.63E-03	3.30E-02
ASU Regen Heater	Cobalt	SRC13	8.24E-09	3.61E-08	
Gasifier Heater Vent #1	Cobalt	SRC14	7.41E-07	3.25E-06	
Gasifier Heater Vent #2	Cobalt	SRC15	7.41E-07	3.25E-06	
Gasifier Flare	Cobalt	SRC16	1.24E-07	5.41E-07	
Process Flare	Cobalt	SRC21	1.24E-07	5.41E-07	
Package Boiler	Cobalt	SRC24	2.06E-05	9.02E-05	
Ammonia Storage Flare	Cobalt	SRC27	6.18E-08	2.71E-07	
Total			2.24E-05	9.81E-05	3.30E-03
Selexol AGR CO2 Vent	COS	SRC17	1.86E-01	8.14E-01	
Total			1.86E-01	8.14E-01	2.70E-02

Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1.		2.	3.		4.
Source Name	Pollutant	Source ID	lb/hr	T/yr	EL (lb/hr)
ASU Regen Heater	Dichlorobenzene	SRC13	1.18E-07	5.15E-07	
Gasifier Heater Vent #1	Dichlorobenzene	SRC14	1.06E-05	4.64E-05	
Gasifier Heater Vent #2	Dichlorobenzene	SRC15	1.06E-05	4.64E-05	
Gasifier Flare	Dichlorobenzene	SRC16	1.76E-06	7.73E-06	
Process Flare	Dichlorobenzene	SRC21	1.76E-06	7.73E-06	
Package Boiler	Dichlorobenzene	SRC24	2.94E-04	1.29E-03	
Ammonia Storage Flare	Dichlorobenzene	SRC27	8.82E-07	3.86E-06	
Total			3.20E-04	**1.40E-03**	2.00E+01
ASU Regen Heater	Flouranthene	SRC13	3.00E-10	1.31E-09	
Gasifier Heater Vent #1	Flouranthene	SRC14	2.70E-08	1.18E-07	
Gasifier Heater Vent #2	Flouranthene	SRC15	2.70E-08	1.18E-07	
Gasifier Flare	Flouranthene	SRC16	4.50E-09	1.97E-08	
Process Flare	Flouranthene	SRC21	4.50E-09	1.97E-08	
Package Boiler	Flouranthene	SRC24	7.50E-07	3.29E-06	**POM: Fluoranthene is a**
Ammonia Storage Flare	Flouranthene	SRC27	2.25E-09	9.86E-09	**15-PAH Group HAP**
Total			8.16E-07	**3.57E-06**	-
ASU Regen Heater	Flourene	SRC13	2.75E-10	1.20E-09	
Gasifier Heater Vent #1	Flourene	SRC14	2.47E-08	1.08E-07	
Gasifier Heater Vent #2	Flourene	SRC15	2.47E-08	1.08E-07	
Gasifier Flare	Flourene	SRC16	4.12E-09	1.80E-08	
Process Flare	Flourene	SRC21	4.12E-09	1.80E-08	
Package Boiler	Flourene	SRC24	6.86E-07	3.01E-06	**POM: Fluorene is**
Ammonia Storage Flare	Flourene	SRC27	2.06E-09	9.02E-09	**a 15-PAH Group HAP**
Total			7.46E-07	**3.27E-06**	-
ASU Regen Heater	Formaldehyde	SRC13	7.35E-06	3.22E-05	
Gasifier Heater Vent #1	Formaldehyde	SRC14	6.62E-04	2.90E-03	
Gasifier Heater Vent #2	Formaldehyde	SRC15	6.62E-04	2.90E-03	
Gasifier Flare	Formaldehyde	SRC16	1.10E-04	4.83E-04	
Process Flare	Formaldehyde	SRC21	1.10E-04	4.83E-04	
Package Boiler	Formaldehyde	SRC24	1.84E-02	8.05E-02	
2 MW Emergency Generator	Formaldehyde	SRC25	1.52E-03	7.62E-05	
500 KW Emergency Firewater Pump	Formaldehyde	SRC26	4.01E-04	2.01E-05	
Ammonia Storage Flare	Formaldehyde	SRC27	5.51E-05	2.42E-04	
Total			2.19E-02	**8.76E-02**	5.10E-04
Selexol AGR CO2 Vent	H_2S	SRC17	2.34E-01	1.03E+00	
Sulfuric Acid Vent	H_2S	SRC18			NOT HAP
Process Fugitives	**H_2S**	—	**2.02E-01**	**8.86E-01**	
Total			**4.37E-01**	1.91E+00	9.33E-01
Sulfuric Acid Vent	H_2SO_4	SRC18			NOT HAP
Total			0.00E+00	0.00E+00	6.70E-02
ASU Regen Heater	Hexane	SRC13	1.76E-04	7.73E-04	
Gasifier Heater Vent #1	Hexane	SRC14	1.59E-02	6.96E-02	
Gasifier Heater Vent #2	Hexane	SRC15	1.59E-02	6.96E-02	
Gasifier Flare	Hexane	SRC16	2.65E-03	1.16E-02	
Process Flare	Hexane	SRC21	2.65E-03	1.16E-02	
Package Boiler	Hexane	SRC24	4.41E-01	1.93E+00	
Ammonia Storage Flare	Hexane	SRC27	1.32E-03	5.80E-03	
Total			4.80E-01	**2.10E+00**	1.20E+01
Nitric Acid Unit - Tail Gas	HNO_3	SRC20	4.36E-01	1.91E+00	
AN Neutralizer Vent	HNO_3	SRC29	5.00E-01	2.19E+00	NOT HAP
Total			9.36E-01	4.10E+00	3.33E-01
ASU Regen Heater	Lead	SRC13	4.90E-08	2.15E-07	
Gasifier Heater Vent #1	Lead	SRC14	4.41E-06	1.93E-05	
Gasifier Heater Vent #2	Lead	SRC15	4.41E-06	1.93E-05	
Gasifier Flare	Lead	SRC16	7.35E-07	3.22E-06	
Process Flare	Lead	SRC21	7.35E-07	3.22E-06	
Package Boiler	Lead	SRC24	1.23E-04	5.37E-04	
Ammonia Storage Flare	Lead	SRC27	3.68E-07	1.61E-06	
Total			1.33E-04	**5.84E-04**	–

SOUTHEAST IDAHO ENERGY, LLC - P-2008.0066 APP Emissions Characterization - Steady State Operations - FINAL 2009 DEQ.XLS TAP Comparison

Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1. Source Name	Pollutant	2. Source ID	3. lb/hr	T/yr	4. EL (lb/hr)
ASU Regen Heater	Manganese	SRC13	3.73E-08	1.63E-07	
Gasifier Heater Vent #1	Manganese	SRC14	3.35E-06	1.47E-05	
Gasifier Heater Vent #2	Manganese	SRC15	3.35E-06	1.47E-05	
Gasifier Flare	Manganese	SRC16	5.59E-07	2.45E-06	
Process Flare	Manganese	SRC21	5.59E-07	2.45E-06	
Package Boiler	Manganese	SRC24	9.31E-05	4.08E-04	
Ammonia Storage Flare	Manganese	SRC27	2.79E-07	1.22E-06	
Total			1.01E-04	4.44E-04	6.70E-02
ASU Regen Heater	Mercury	SRC13	2.55E-08	1.12E-07	
Gasifier Heater Vent #1	Mercury	SRC14	2.29E-06	1.00E-05	
Gasifier Heater Vent #2	Mercury	SRC15	2.29E-06	1.00E-05	
Gasifier Flare	Mercury	SRC16	3.82E-07	1.67E-06	
Process Flare	Mercury	SRC21	3.82E-07	1.67E-06	
Package Boiler	Mercury	SRC24	6.37E-05	2.79E-04	
Ammonia Storage Flare	Mercury	SRC27	1.91E-07	8.37E-07	
Total			6.93E-05	3.04E-04	1.00E-03
ASU Regen Heater	Naphthalene	SRC13	5.98E-08	2.62E-07	
Gasifier Heater Vent #1	Naphthalene	SRC14	5.38E-06	2.36E-05	
Gasifier Heater Vent #2	Naphthalene	SRC15	5.38E-06	2.36E-05	
Gasifier Flare	Naphthalene	SRC16	8.97E-07	3.93E-06	
Process Flare	Naphthalene	SRC21	8.97E-07	3.93E-06	
Package Boiler	Naphthalene	SRC24	1.50E-04	6.55E-04	
2 MW Emergency Generator	Naphthalene	SRC25	2.51E-03	1.25E-04	
500 KW Emergency Firewater Pump	Naphthalene	SRC26	6.61E-04	3.31E-05	
Ammonia Storage Flare	Naphthalene	SRC27	4.49E-07	1.96E-06	
Total			3.33E-03	8.71E-04	3.33E+00
Sulfuric Acid Vent	NH_3	SRC18			
Urea Granulation Vent	NH_3	SRC19	7.71E+01	3.38E+02	
Nitric Acid Unit - Tail Gas	NH_3	SRC20	2.19E+00	9.59E+00	
AN Neutralizer Vent	NH_3	SRC29	2.38E+01	1.04E+02	
Urea Melt Plant Vent	NH3	SRC23	3.02E+01	1.32E+02	
Process Flare	NH_3	SRC21	4.36E+00	1.91E+01	NOT HAP
Total			1.38E+02	6.03E+02	1.20E+00
ASU Regen Heater	Nickel	SRC13	2.06E-07	9.02E-07	
Gasifier Heater Vent #1	Nickel	SRC14	1.85E-05	8.12E-05	
Gasifier Heater Vent #2	Nickel	SRC15	1.85E-05	8.12E-05	
Gasifier Flare	Nickel	SRC16	3.09E-06	1.35E-05	
Process Flare	Nickel	SRC21	3.09E-06	1.35E-05	
Package Boiler	Nickel	SRC24	5.15E-04	2.25E-03	
Ammonia Storage Flare	Nickel	SRC27	1.54E-06	6.76E-06	
Total			5.60E-04	2.45E-03	2.70E-05
2 MW Emergency Generator	PAH	SRC25	4.09E-03	2.05E-04	PAHs are a subset of POM
500 KW Emergency Firewater Pump	PAH	SRC26	1.08E-03	5.39E-05	
Total			5.17E-03	2.59E-04	9.10E-05
ASU Regen Heater	Phenanathrene	SRC13	1.67E-09	7.30E-09	PAHs are a subset of POM
Gasifier Heater Vent #1	Phenanathrene	SRC14	1.50E-07	6.57E-07	
Gasifier Heater Vent #2	Phenanathrene	SRC15	1.50E-07	6.57E-07	
Gasifier Flare	Phenanathrene	SRC16	2.50E-08	1.10E-07	Natural gas emissions are
Process Flare	Phenanathrene	SRC21	2.50E-08	1.10E-07	phenanthrene,
Package Boiler	Phenanathrene	SRC24	4.17E-06	1.83E-05	not phenananthrene
Ammonia Storage Flare	Phenanathrene	SRC27	1.25E-08	5.48E-08	POM: Phenanthrene is a PAH
Total			4.53E-06	1.98E-05	-
ASU Regen Heater	Pyrene	SRC13	4.90E-10	2.15E-09	
Gasifier Heater Vent #1	Pyrene	SRC14	4.41E-08	1.93E-07	
Gasifier Heater Vent #2	Pyrene	SRC15	4.41E-08	1.93E-07	
Gasifier Flare	Pyrene	SRC16	7.35E-09	3.22E-08	
Process Flare	Pyrene	SRC21	7.35E-09	3.22E-08	
Package Boiler	Pyrene	SRC24	1.23E-06	5.37E-06	
Ammonia Storage Flare	Pyrene	SRC27	3.68E-09	1.61E-08	POM: Pyrene is a PAH HAP
Total			1.33E-06	5.84E-06	-

SOUTHEAST IDAHO ENERGY, LLC - P-2008.0066 APP Emissions Characterization - Steady State Operations - FINAL 2009 DEQ.XLS TAP Comparison

Emissions Characterization - Steady State Operation

SCL COMPARISON OF TOXIC POLLUTANTS (OTHER) - ALL SOURCES

1. Source Name	Pollutant	2. Source ID	3. lb/hr	T/yr	4. EL (lb/hr)
ASU Regen Heater	Toluene	SRC13	3.33E-07	1.46E-06	
Gasifier Heater Vent #1	Toluene	SRC14	3.00E-05	1.31E-04	
Gasifier Heater Vent #2	Toluene	SRC15	3.00E-05	1.31E-04	
Gasifier Flare	Toluene	SRC16	5.00E-06	2.19E-05	
Process Flare	Toluene	SRC21	5.00E-06	2.19E-05	
Package Boiler	Toluene	SRC24	8.33E-04	3.65E-03	
2 MW Emergency Generator	Toluene	SRC25	5.43E-03	2.71E-04	
500 KW Emergency Firewater Pump	Toluene	SRC26	1.43E-03	7.15E-05	
Ammonia Storage Flare	Toluene	SRC27	2.50E-06	1.10E-05	
Total			7.76E-03	4.31E-03	2.50E+01
2 MW Emergency Generator	Xylene	SRC25	3.73E-03	1.86E-04	
500 KW Emergency Firewater Pump	Xylene	SRC26	9.82E-04	4.91E-05	
Total			4.71E-03	2.35E-04	2.90E+01

TOTAL PAHs = [illegible] [illegible]

TOTAL HAPs (TPY)= 3.02

Emissions Characterization - Steady State Operation

2 MW DIESEL ENGINE EMISSIONS CALCULATIONS

Engine Information	**Caterpiller Standby Generator 3516C**				
Size:	**2682 hp**		2000 kW		
Annual Operation	**100 hours**				
Fuel Sulfur	**0.05 percent by weight**				
	Vendor Supplied Emission Rates		Calc Fuel Cons.	Emission Rate	Emission Rate
Pollutant	g/hp-hr	lb/hp-hr	MMBtu/hr	lb/hr	TPY
NOX	5.39	0.011872		31.84	1.59
CO	0.29	0.000639		1.71	0.09
SOx		0.000365		0.98	0.05
PM10	0.03	0.000057		0.15	0.01
VOC	0.11	0.000242		0.65	0.03
	AP-42	lb/MMBtu/hr	19.31		
Acetaldehyde		2.52E-05		0.00049	0.00002
Acrolein		7.88E-06		0.00015	0.00001
Benzene		7.76E-04		0.01498	0.00075
Formaldehyde		7.89E-05		0.00152	0.00008
Naphthalene		1.30E-04		0.00251	0.00013
PAH		2.12E-04		0.00409	0.00020
Toluene		2.81E-04		0.00543	0.00027
Xylene		1.93E-04		0.00373	0.00019

Engine Information	Caterpiller Standby Generator 3516C
Size:	2682 hp
Annual Operation	100 hours
Fuel Sulfur	0.05 percent by weight

Estimated Stack Parameters

Parameters	Value	Unit	Assumptions/Comments
Power Output	2682	hp	Vendor Supplied Output
Height =	33.0	ft	
	10.1	m	
Temperature =	762	F	Vendor Supplied Temperature Data
	679	K	
Diameter =	2.00	ft	Engineering Estimate
	0.61	m	
Exhaust Flowrate=	15136	cfm	Vendor Supplied Data
	7.1	m^3/s	
Velocity =	80.3	ft/s	Calculated
	24.5	m/s	

Emissions Characterization - Steady State Operation

500 KW DIESEL ENGINE EMISSIONS CALCULATIONS

Engine Information — **Caterpillar Standby Generator C15 ACERT**
Size: **670.5 hp** — 500 kW
Annual Operation **100 hours**
Fuel Sulfur **0.05 percent by weight**

Pollutant	Vendor Supplied Emission Rates g/hp-hr	lb/hp-hr	Calc Fuel Cons MMBtu/hr	Emission Rate lb/hr	Emission Rate TPY
NOX	5.74	0.012643		8.46	0.42
CO	0.40	0.000881		0.59	0.03
SOx		0.000382		0.26	0.01
PM10	0.02	0.000040		0.03	0.00
VOC	0.01	0.000022		0.01	0.00
	AP-42	lb/MMBtu/hr	5.09		
Acetaldehyde		2.52E-05		0.00013	0.00001
Acrolein		7.86E-06		0.00004	0.00000
Benzene		7.76E-04		0.00395	0.00020
Formaldehyde		7.89E-05		0.00040	0.00002
Naphthalene		1.30E-04		0.00066	0.00003
PAH		2.12E-04		0.00108	0.00005
Toluene		2.81E-04		0.00143	0.00007
Xylene		1.93E-04		0.00098	0.00005

Engine Information — Caterpillar Standby Generator C15 ACERT
Size 670.5 hp
Annual Operation 100 hours
Fuel Sulfur 0.05 percent by weight

Estimated Stack Parameters

Parameters	Value	Unit	Assumptions/Comments
Power Output	670.5	hp	Vendor Supplied Output
Height =	15.0	ft	
	4.6	m	
Temperature =	942.1	F	Vendor Supplied Temperature Data
	779	K	
Diameter =	1.00	ft	Engineering Estimate
	0.30	m	
Exhaust Flowrate=	3842	cfm	Vendor Supplied Data
	1.8	m^3/s	
Velocity =	81.5	ft/s	Calculated
	24.9	m/s	

Emissions Characterization - Steady State Operation

ASU REGENERATION HEATER EMISSION CALCULATIONS

REH – Preliminary Estimated Utility Requirements

Process Unit	Fuel Fired, MM BTU/hr	Power, kw	MP Steam (lb/hr)	LP Steam (lb/hr)	Natural Gas (lbmol/hr)	Combustion Air 3% excess O2 - lb/mol	Exhaust Flow (lbmol/hr	SCFM	acfm
			---	---					
ASU REGENERATION HEATER EMISSION CALCULATIONS	0.1				0.27	2.63	2.90	17.36	37.44

Heater Information

Size:	**0.1 MMBtu/hr**
Annual Operation	**8760 hours**
Fuel Sulfer	**2 grains/100dscf**

Fuel	Emission ID	Hazardous Air Pollutant	Mol Wt	AP-42 Emission Factors (lb/MMscf (HHV))	AP-42 Emission Factors (lb/MMBtu (HHV))	Emission Rate lb/hr	Emission Rate TPY
		NOx		5.00E+01	4.90E-02	4.90E-03	0.021471
		CO		8.40E+01	8.24E-02	8.24E-03	0.036071
		PM10		7.60E+00	7.45E-03	7.45E-04	0.003264
		SOx		6.00E-01	5.88E-04	5.88E-05	0.000258
		VOC		1.10E+01	1.08E-02	1.08E-03	0.004724
NG	NGH	2-Methylnaphthalene	142	2.40E-05	2.35E-08	2.35E-09	0.000000
NG	NGH	Arsenic	74.92	2.00E-04	1.96E-07	1.96E-08	0.000000
NG	NGH	Benzene	78	2.10E-03	2.06E-06	2.06E-07	0.000001
NG	NGH	Cadmium	112.4	1.10E-03	1.08E-06	1.08E-07	0.000000
NG	NGH	Chromium	52	1.40E-03	1.37E-06	1.37E-07	0.000001
NG	NGH	Cobalt	58.47	8.40E-05	8.24E-08	8.24E-09	0.000000
NG	NGH	Dichlorobenzene	147	1.20E-03	1.18E-06	1.18E-07	0.000001
NG	NGH	Flouranthene	202	3.06E-06	3.00E-09	3.00E-10	0.000000
NG	NGH	Flourene	166	2.80E-06	2.75E-09	2.75E-10	0.000000
NG	NGH	Formaldehyde	30	7.50E-02	7.35E-05	7.35E-06	0.000032
NG	NGH	Hexane	86	1.80E+00	1.76E-03	1.76E-04	0.000773
NG	NGH	Lead	207.2	5.00E-04	4.90E-07	4.90E-08	0.000000
NG	NGH	Manganese	54.94	3.80E-04	3.73E-07	3.73E-08	0.000000
NG	NGH	Mercury	200.5	2.60E-04	2.55E-07	2.55E-08	0.000000
NG	NGH	Naphthalene	128	6.10E-04	5.98E-07	5.98E-08	0.000000
NG	NGH	Nickel	58.69	2.10E-03	2.06E-06	2.06E-07	0.000001
NG	NGH	Phenanathrene	178	1.70E-05	1.67E-08	1.67E-09	0.000000
NG	NGH	Pyrene	202	5.00E-06	4.90E-09	4.90E-10	0.000000
NG	NGH	Toluene	92	3.40E-03	3.33E-06	3.33E-07	0.000001

Emissions Characterization - Steady State Operation

GASIFIER HEATER VENT

Heater Information	
Size:	9 MMBtu/hr
Annual Operation	8760 hours
Fuel Sulfer	2 grains/100dscf

Fuel	Emission ID	Hazardous Air Pollutant	Mol Wt	AP-42 Emission Factors (lb/MMscf (HHV))	AP-42 Emission Factors (lb/MMBtu (HHV))	Emission Rate lb/hr	Emission Rate TPY
		NOx		1.00E+02	9.80E-02	8.82E-01	3.866
		CO		8.40E+01	8.24E-02	7.41E-01	3.246
		PM10		7.60E+00	7.45E-03	6.71E-02	0.294
		SOx*		6.00E+00	5.88E-03	5.29E-02	0.232
		VOC		5.50E+00	5.39E-03	4.85E-02	0.213
NG	**NGH**	2-Methylnaphthalene	142	2.40E-05	2.35E-08	2.12E-07	0.000
NG	**NGH**	Arsenic	74.92	2.00E-04	1.96E-07	1.76E-06	0.000
NG	**NGH**	Benzene	78	2.10E-03	2.06E-06	1.85E-05	0.000
NG	**NGH**	Cadmium	112.4	1.10E-03	1.08E-06	9.71E-06	0.000
NG	**NGH**	Chromium	52	1.40E-03	1.37E-06	1.24E-05	0.000
NG	**NGH**	Cobalt	58.47	8.40E-05	8.24E-08	7.41E-07	0.000
NG	**NGH**	Dichlorobenzene	147	1.20E-03	1.18E-06	1.06E-05	0.000
NG	**NGH**	Flouranthene	202	3.06E-06	3.00E-09	2.70E-08	0.000
NG	**NGH**	Flourene	166	2.80E-06	2.75E-09	2.47E-08	0.000
NG	**NGH**	Formaldehyde	30	7.50E-02	7.35E-05	6.62E-04	0.003
NG	**NGH**	Hexane	86	1.80E+00	1.76E-03	1.59E-02	0.070
NG	**NGH**	Lead	207.2	5.00E-04	4.90E-07	4.41E-06	0.000
NG	**NGH**	Manganese	54.94	3.80E-04	3.73E-07	3.35E-06	0.000
NG	**NGH**	Mercury	200.5	2.60E-04	2.55E-07	2.29E-06	0.000
NG	**NGH**	Naphthalene	128	6.10E-04	5.98E-07	5.38E-06	0.000
NG	**NGH**	Nickel	58.69	2.10E-03	2.06E-06	1.85E-05	0.000
NG	**NGH**	Phenanathrene	178	1.70E-05	1.67E-08	1.50E-07	0.000
NG	**NGH**	Pyrene	202	5.00E-06	4.90E-09	4.41E-08	0.000
NG	**NGH**	Toluene	92	3.40E-03	3.33E-06	3.00E-05	0.000

*Adjusted to 2 grains / 100 scf natural gas

Natural Gas			
Fuel Flow	0.00882 MMscf/hr		
Fuel Flow	355.78748 lb/hr		
Carbon	7.49E-01 %/wt		22.201 lb-mol/hr
Hyrdrogen	2.51E-01 %/wt		88.489 lb-mol/hr
atm-Oxygen Requirements	50.8719 lb-mol/hr	15% excess O2	

Heater Information	
Size:	9 MMBtu/hr
Annual Op	8760 hours
Fuel Sulfur	2.5 grains/100dscf

Estimated Stack Parameters

Parameter	Value	Unit	Assumptions/Comments
Heat Input=	9	MMBtu/hr	Annual Average Heat Input
Preheater II	170	ft	Engineering
	51.82	m	
Temperatur	1000	F	Engineering
	811	K	
Diameter =	1.5	ft	Engineering Estimate
	0.46	m	
Exit Flowr	1,919	scfm	Flowrate is
	5309	acfm	Corrected for actual temperature using Ideal Gas Law.
	3	m^3/s	
	8659	lb/hr	Estimated using Ideal Gas Law and assuming exhaust molecular weight of 29 lb/lb-mole.
Velocity =	50.1	ft/s	Calculated
	15.3	m/s	

Emissions Characterization - Steady State Operation

PACKAGE BOILER EMISSIONS CALCULATIONS

Criteria Pollutants. Emission Rates confirmed with Mesaba Permit Application

	lb/MMBtu	
SO2	0.00572	2.0 grain total sulfur/100 scf pipeline natural gas
NOx	0.02	Low NOx burner and FGR
CO	0.074	
PM10	0.005	
VOC	0.004	

SO2	1.43 lb/hr	6.26 ton/yr
NOx	5.00 lb/hr	21.90 ton/yr
CO	18.50 lb/hr	81.03 ton/yr
PM10	1.25 lb/hr	5.48 ton/yr
VOC	1.00 lb/hr	4.38 ton/yr

Volumetric Flowrate	F-Factor Based	
Fd	8,710.0	scf/MMBtu
Volumetric Flowrate	2,177,500.0	scf/hr
Volumetric Flowrate	52,282.3	acf/min
Volumetric Flowrate	24.7	actual cubic meters per sec

Modeling Stack Parameters

Height	Diameter	Temp (K)	Velocity (m/s)
33.50	1.75	422.10	10.25

Boiler Information

Size:	**250 MMBtu/hr**
Annual Operation	**8760 hours**
Fuel Sulfur	**2 grains/100dscf**

Fuel	Emission ID	Hazardous Air Pollutant	Mol Wt	AP-42 Emission Factors (lb/MMscf (HHV))	AP-42 Emission Factors (lb/MMBtu (HHV))	Emission Rate lb/hr	Emission Rate TPY
NG	AUX-1	2-Methylnaphthalene	142	2.40E-05	2.35E-08	5.88E-06	0.0000
NG	AUX-2	Arsenic	74.92	2.00E-04	1.96E-07	4.90E-05	0.0002
NG	AUX-3	Benzene	78	2.10E-03	2.06E-06	5.15E-04	0.0023
NG	AUX-4	Cadmium	112.4	1.10E-03	1.08E-06	2.70E-04	0.0012
NG	AUX-5	Chromium	52	1.40E-03	1.37E-06	3.43E-04	0.0015
NG	AUX-6	Cobalt	58.47	8.40E-05	8.24E-08	2.06E-05	0.0001
NG	AUX-7	Dichlorobenzene	147	1.20E-03	1.18E-06	2.94E-04	0.0013
NG	AUX-8	Flouranthene	202	3.06E-06	3.00E-09	7.50E-07	0.0000
NG	AUX-9	Flourene	166	2.80E-06	2.75E-09	6.86E-07	0.0000
NG	AUX-10	Formaldehyde	30	7.50E-02	7.35E-05	1.84E-02	0.0805
NG	AUX-11	Hexane	86	1.80E+00	1.76E-03	4.41E-01	1.9324
NG	AUX-12	Lead	207.2	5.00E-04	4.90E-07	1.23E-04	0.0005
NG	AUX-13	Manganese	54.94	3.80E-04	3.73E-07	9.31E-05	0.0004
NG	AUX-14	Mercury	200.5	2.60E-04	2.55E-07	6.37E-05	0.0003
NG	AUX-15	Naphthalene	128	6.10E-04	5.98E-07	1.50E-04	0.0007
NG	AUX-16	Nickel	58.69	2.10E-03	2.06E-06	5.15E-04	0.0023
NG	AUX-17	Phenanathrene	178	1.70E-05	1.67E-08	4.17E-06	0.0000
NG	AUX-18	Pyrene	202	5.00E-06	4.90E-09	1.23E-06	0.0000
NG	AUX-19	Toluene	92	3.40E-03	3.33E-06	8.33E-04	0.0037

Emissions Characterization - Steady State Operation

SELEXOL AGR CO2 VENT

T.O. DRE increased from 90% in Application Addendum No. 4 to: 95%

	MP CO2 Vent
Temperature (F)	28
Pressure (psig)	44
Total Flow (lbmol/hr)	6,874
Total Flow (lbmol/day)	164,976
Total Flow (lb/hr)	299,585

Component Mol%	MP CO2 Vent	MP CO2 Vent lbmol/hr	MP CO2 Vent Mol Wt	Uncontrolled MP CO2 Vent lb/hr	Controlled Thermal Oxidizer MP CO2 Vent lb/hr	
H2O	0.07%	4.81	18.0	86.7	86.69	
CO2	98.89%	6,797.70	44.0	299,165.4	299,440.35	SIE E17+ (C18 + C21)*D17
H2S*	0.0001%	0.007	34.1	0.23	0.23	**SIE took no credit for H2S DRE**
COS*	0.0009%	0.062	60.1	3.7	**0.19**	
H2	0.94%	64.62	2.0	130.3	**6.51**	
CO	0.09%	6.19	28.0	173.3	**8.66**	
N2	0.01%	0.69	28.0	19.3		
Ar	0.00%	-	39.9	-		
CH4	0.00%	-	16.0	-		
SO2			64.1		**3.76**	

*Assumtions: from UOP (model runs predicted lower results):
- -9 ppm COS
- -1 ppm H2S

Thermal Oxidizer

9	MMBtu/hr burner	per CSM Worldwide quote
100	lb NOx/10^6 scf	per AP-42 Table 1.4-1
0.098	lb NOx/MMBtu	for 1020 BTU/scf natual gas

Emissions Characterization - Steady State Operation

ASSUMPTIONS USED IN FLARE CALULATIONS

Air Contaminants from burning Fuels in Flares*

	Steam-assist	Other
Thermal NO_x (high Btu** fuel) lb/MMBtu	0.0485	0.138
Thermal NOX (low Btu** fuel) lb/MMBtu	0.068	0.0641
Fuel NOX	0.5	wt% of inlet NH3
CO (high Btu** fuel) lb/MMBtu	0.3503	0.2755
CO (low Btu** fuel) lb/MMBtu	0.3465	0.5496
PM	none (smokeless)	
SO2	100% of Sulfur in Fuel	

*From TCEQ's "Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers" Table 4

**High Btu is > 1,000 Btu/scf

Waste Stream Destruction/Removal Efficiencies in Flares*

VOC	<=3 Carbons	99%
VOC	>3 Carbons	98%
H2S		98%
NH3	case by case	98%
CO	case by case	98%

*From TCEQ's "Air Permit Technical Guidance for Chemical Sources: Flares and Vapor Oxidizers" Table 4

**Mesaba assumed 99% for CO & H2S

**PMEC assumed 98% for H2S and 99% for CO

Emission Factors for Criteria Pollutants and Greenhouse

Pollutant	Emission Factor (lb/10^6 scf)
NOX (Large Wall-Fired Boiler Uncontrolled Post	280
CO (Large Wall-Fired Boiler Uncontrolled Post N	84
PM (Total)	7.6
PM (Condensable)	5.7
PM (Filterable)	1.9
SO2	0.6
VOC	5.5

* From AP-42 Section 1.4, Table 1.4-2

Net Heats of Combustion

	Net heat of Combustion* Btu/lb 60F, 30inHG	Btu/scf
NH3	8,001	380
H2O	0	0
CO2	0	0
N2	0	0
H2	51,623	290
CH4	21,520	962
O2	0	0
CO	4,347	339
H2S	6,545	621
Ar	0	0
Ethane	20,432	1,711
Propane	19,944	2,450
n-Butane	19,680	3,186

*From Perrys Chemical Engineers' Handbook, Sixth Edition pg 9-37

Conversion Factors

3.28	ft/m
948	BTU/MJ
359	scf/lbmol
3.97	Btu/kcal
0.0283	m3/ft3
252	cal/Btu
7,000	grains/lb

Natural Gas Assumptions

2	grain S / 100 scf
1,020	Btu/scf

Molecular Weights

	mol wt
H	1.01
O	16.00
N	14.01
C	12.01
S	32.06
NH3	17.03
H2O	18.02
CO2	44.01
N2	28.01
H2	2.02
CH4	16.04
O2	32.00
CO	28.01
H2S	34.08
Ar	39.95
Ethane	30.07
Propane	44.10
n-Butane	58.12
NO2	46.01
SO2	64.06

Emissions Characterization - Steady State Operation

FLARE STEADY STATE CALCULATIONS

FROM WORLEY PARSONS						
	Heating Value MJ/scm	Heating Value Btu/scf	Temperature deg F	Flow Rate acfm	Flow Rate scfm	Flow Rate lbmol/hr
Pilot - Process Flare*		1,020.00	1831	106.3	24.5	4
N2 Purge Gas - Process Flare			1831	75	17.4	3
Pilot - Gasification Flare*		1,020.00	1831	106.3	24.5	4
N2 Purge Gas - Gasification Flare			1831	75	17.4	3
Pilot - Ammonia Storage Flare**		1,020.00	1831	53.2	12.3	2
N2 Purge Gas - Ammonia Storage Flare			1831	75	17.4	3
Ammonia Continuous***			(27.00)	74	85	14

*Assumes 1.5 MMBtu/hr Pilot
**Assumes .75 MMBtu/hr Pilot
*** Used WP's Ammonia number, added N2 and H2 based on REH ASPEN Runs + mehtane and CO from UOP

Emission Factors	NOx lb/MMBtu	CO lb/MMBtu	PM lb/MMBtu	SO2 lb/MMBtu	VOC lb/MMBtu
Process Flare					
Steady State	0.3998	0.3950	0.0176	0.0026	0.0134
Gasification Flare					
Steady State	0.0680	0.3465	0.0075	0.0056	0.0094
Ammonia Storage Flare					
Steady State	0.0680	0.3465	0.0075	0.0056	0.0133

Emission Rates	NOx lb/hr	CO lb/hr	PM lb/hr	SO2 lb/hr	VOC lb/hr
Process Flare					
Steady State	1.3147	1.2988	0.0579	0.0084	0.0442
Gasification Flare					
Steady State	0.0999	0.5091	0.0109	0.0082	0.0138
Ammonia Storage Flare					
Steady State	0.0500	0.2546	0.0055	0.0041	0.0098

Emissions Characterization - Steady State Operation

FLARE STEADY STATE CALCULATIONS - CONTINUED

Process Flare - Steady State	Pilot	Purge Gas	Total Ammonia Unit	Total lbmol/hr	Total lb/hr	Total MMBtu/hr	Btu/scf	Net Heat Release cal/sec	Effective Diameter meters
Total Flow lbmol/hr	4.10	2.90	14.22	21.22	390.57	3.29	431.62	230,187.24	0.43
Components									
NH3			90.1%	12.81	218.22	1.75			
N2		100.0%	3.2%	3.36	94.25	0.00			
H2			4.6%	0.66	1.32	0.07			
CH4	95.0%		0.1%	3.91	62.66	1.35			
CO			2.0%	0.28	7.97				
O2				0.00	0.00	0.00			
Ar				0.00	0.00				
C2H6	5.0%			0.20	6.16	0.13			
Total	100.0%	100.0%	100.0%	21.23	390.57	3.29			

Gasification Flare - Steady State	Pilot	Purge Gas		Total lbmol/hr	Total lb/hr	Total MMBtu/hr	Total Btu/scf	Net Heat Release cal/sec	Effective Diameter meters
Total Flow lbmol/hr	4.1	2.9		7.00	149.95	1.47	584.64	102,853.38	0.29
Components									
N2		100.00%		2.90	81.36	0.00			
H2				0.00	0.00	0.00			
CH4	95.00%			3.89	62.43	1.34			
CO				0.00	0.00	0.00			
Ar				0.00	0.00	0.00			
Ethane	5.00%			0.20	6.16	0.13			
Total	100.00%	100.00%	0.00%	7.00	149.95	1.47			

Ammonia Storage Flare - Steady State	Pilot	Purge Gas	Total lbmol/hr	Total lb/hr	Total MMBtu/hr	Total Btu/scf	Net Heat Release cal/sec	Effective Diameter meters
Total Flow lbmol/hr	2.0	2.9	4.95	115.65	0.73	413.22	51,426.69	0.20
Components								
N2		100%	2.90	81.36	0.00			
CH4	95%		1.95	31.22	0.67			
Ethane	5%		0.10	3.08	0.06			
Total	100%	100%	4.95	115.65	0.73			

Emissions Characterization - Steady State Operation

FLARE STEADY STATE CALCULATIONS - HAPS

HAPS from Pilot on Flares (Gasification, Process)

Size:	1.50	MMBtu/hr
Per Year	8760	hours
Fuel Sulfer	2	grains/100dscf

			AP-42 Emission Factors		Emission Rate	Emission Rate
Fuel	Hazardous Air Pollutant	Mol Wt	(lb/MMscf (HHV))	(lb/MMBtu (HHV))	lb/hr	Tons/yr
NG	2-Methylnaphthalene	142	2.40E-05	2.35E-08	3.53E-08	1.55E-07
NG	Arsenic	74.92	2.00E-04	1.96E-07	2.94E-07	1.29E-06
NG	Benzene	78	2.10E-03	2.06E-06	3.09E-06	1.35E-05
NG	Cadmium	112.4	1.10E-03	1.08E-06	1.62E-06	7.09E-06
NG	Chromium	52	1.40E-03	1.37E-06	2.06E-06	9.02E-06
NG	Cobalt	58.47	8.40E-05	8.24E-08	1.24E-07	5.41E-07
NG	Dichlorobenzene	147	1.20E-03	1.18E-06	1.76E-06	7.73E-06
NG	Flouranthene	202	3.06E-06	3.00E-09	4.50E-09	1.97E-08
NG	Flourene	166	2.80E-06	2.75E-09	4.12E-09	1.80E-08
NG	Formaldehyde	30	7.50E-02	7.35E-05	1.10E-04	4.83E-04
NG	Hexane	86	1.80E+00	1.76E-03	2.65E-03	1.16E-02
NG	Lead	207.2	5.00E-04	4.90E-07	7.35E-07	3.22E-06
NG	Manganese	54.94	3.80E-04	3.73E-07	5.59E-07	2.45E-06
NG	Mercury	200.5	2.60E-04	2.55E-07	3.82E-07	1.67E-06
NG	Naphthalene	128	6.10E-04	5.98E-07	8.97E-07	3.93E-06
NG	Nickel	58.69	2.10E-03	2.06E-06	3.09E-06	1.35E-05
NG	Phenanathrene	178	1.70E-05	1.67E-08	2.50E-08	1.10E-07
NG	Pyrene	202	5.00E-06	4.90E-09	7.35E-09	3.22E-08
NG	Toluene	92	3.40E-03	3.33E-06	5.00E-06	2.19E-05

HAPS from Ammonia/Urea Flare Steady State — **Emmision Factors Based on NH3 DRE from flare**

Hours of Operation 8760 hours

Hazardous Air Pollutant	Emission Rate lb/hr	Emission Rate ton/year
Ammonia	4.36E+00	1.91E+01

HAPS from Pilot on Flares (Ammonia Storage)

Size:	0.75	MMBtu/hr
Per Year	8760	hours
Fuel Sulfer	2	grains/100dscf

			AP-42 Emission Factors		Emission Rate	Emission Rate
Fuel	Hazardous Air Pollutant	Mol Wt	(lb/MMscf (HHV))	(lb/MMBtu (HHV))	lb/hr	Tons/yr
NG	2-Methylnaphthalene	142	2.40E-05	2.35E-08	1.76E-08	7.73E-08
NG	Arsenic	74.92	2.00E-04	1.96E-07	1.47E-07	6.44E-07
NG	Benzene	78	2.10E-03	2.06E-06	1.54E-06	6.76E-06
NG	Cadmium	112.4	1.10E-03	1.08E-06	8.09E-07	3.54E-06
NG	Chromium	52	1.40E-03	1.37E-06	1.03E-06	4.51E-06
NG	Cobalt	58.47	8.40E-05	8.24E-08	6.18E-08	2.71E-07
NG	Dichlorobenzene	147	1.20E-03	1.18E-06	8.82E-07	3.86E-06
NG	Flouranthene	202	3.06E-06	3.00E-09	2.25E-09	9.86E-09
NG	Flourene	166	2.80E-06	2.75E-09	2.06E-09	9.02E-09
NG	Formaldehyde	30	7.50E-02	7.35E-05	5.51E-05	2.42E-04
NG	Hexane	86	1.80E+00	1.76E-03	1.32E-03	5.80E-03
NG	Lead	207.2	5.00E-04	4.90E-07	3.68E-07	1.61E-06
NG	Manganese	54.94	3.80E-04	3.73E-07	2.79E-07	1.22E-06
NG	Mercury	200.5	2.60E-04	2.55E-07	1.91E-07	8.37E-07
NG	Naphthalene	128	6.10E-04	5.98E-07	4.49E-07	1.96E-06
NG	Nickel	58.69	2.10E-03	2.06E-06	1.54E-06	6.76E-06
NG	Phenanathrene	178	1.70E-05	1.67E-08	1.25E-08	5.48E-08
NG	Pyrene	202	5.00E-06	4.90E-09	3.68E-09	1.61E-08
NG	Toluene	92	3.40E-03	3.33E-06	2.50E-06	1.10E-05

Emissions Characterization - Steady State Operation

COOLING TOWER EMISSION CALCULATIONS

Total Liquid Drift Factor **0.0005% (reduced in Application Addendum No. 1 from 0.0010%)**

American Falls Energy Center	Summer Max	Winter Max	Annual Average	Comments	Notes	
CoolingWater Flowrate (GPM)	121,000.00	-	41,152.28	Maximum Heat Balance Model Flowrate	Worley Parsons	
Drift (GPM)	0.61	-	0.21		SPX Study	
Evaporation (GPM)	1,970.00	-	670.00	Assumes 20F Cooling Tower Range	SPX Study	
Blowdown (GPM)	656.06	-	223.13	Assumes 4 cycles.	Water Quality Data	4
TDS (mg/L)	5,000.00	5,000.00	5,000.00	Cooling Tower Limit	SPX Study	
PM Emission Rate (lb/hr)	**1.51**	-	0.51	Assume all TDS as PM10		
PM Emission Rate TPY	**6.63**	-	2.25			

Cooling Towers

Estimated Stack Parameters

Parameters	Value	Unit	Assumptions/Comments
Height =	43.4	ft	SPX Site Specific Study
	13.23	m	
Temperature =	85	F	SPX Site Specific Study
	303	K	
Diameter =	74.08	ft	"Equivalent Diameter" - SPX Site Specific Study
	22.59	m	
Exhaust Flowrate=	1289000	cfm	SPX Site Specific Study
	608	m^3/s	
Velocity =	27.3	ft/s	SPX Site Specific Study
	8.3	m/s	

Emissions Characterization - Steady State Operation

ZERO LIQUID DISCHARGE EMISSION CALCULATIONS

Total Liquid Drift Factor 0.0010%

American Falls Energy Center	Summer Max	Winter Max	Annual Average	Comments	Notes	
CoolingWater Flowrate (GPM)	984.09	-	334.69	Maximum Heat Balance Model Flowrate	Cooling Tower Blowdown as primary source	
Drift (GPM)	0.01	-	0.0033		SPX Study	
Evaporation (GPM)	984.09	-	334.69	Assumes 20F Cooling Tower Range	SPX Study	
Blowdown (GPM)	-	-	-	Assumes 4 cycles.		4
TDS (mg/L)	50,000.00	50,000.00	50,000.00	Cooling Tower Limit	Engineering Estimate	
PM Emission Rate (lb/hr)	0.25	-	0.08	Assume all TDS as PM10		
PM Emission Rate TPY	1.08	-	0.37			

Cooling Towers

Estimated Stack Parameters

Parameters	Value	Unit	Assumptions/Comments
Height =	25	ft	Engineering Estimate
	7.62	m	
Temperature =	110	F	Engineering Estimate
	317	K	
Diameter =	7.50	ft	Engineering Estimate
	2.29	m	
Exhaust Flowrate=	235604	cfm	Engineering Estimate Based on Evaporation Rate
	111	m^3/s	
Velocity =	88.9	ft/s	Engineering Estimate
	27.1	m/s	

Emissions Characterization - Steady State Operation

SUMMARY OF EMISSIONS - PROCESS FUGITIVE EMISSIONS

			Air Pollutant Maximum Change in Emissions Rate (lbs/hr or t/yr)										
	EPA E-Factor		Equipment Count			CO		H2S		Ammonia		NOTES
Emissions units	kg/hr/so	lb/hr/so	Gasification and Syngas Cleanup	Ammonia	Urea and UAN	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	
Point Source(s)												
												(1)(2)(3)(4)
Valves - gas	0.00597	0.01343	730.00	70.00	40.00	3.43	15.03	0.10	0.43	0.31	1.34	(1)(2)(3)(4)
Valves - Lt Liquid	0.00403	0.00907	10.00	140.00	150.00	0.03	0.14	0.00	0.00	0.51	2.22	(1)(2)(3)(4)
Pump Seals - Lt Liquid	0.01990	0.04478	0.00	10.00	10.00	0.00	0.00	0.00	0.00	0.17	0.76	(1)(2)(3)(4)
Compressor Seals	0.22800	0.51300	10.00	10.00	5.00	1.80	7.86	0.05	0.22	1.62	7.09	(1)(2)(3)(4)
Pressure Relief Valves	0.10400	0.23400	8.00	10.00	10.00	0.66	2.87	0.02	0.08	0.91	3.98	(1)(2)(3)(4)
Connectors	0.00183	0.00412	765.00	250.00	300.00	1.10	4.83	0.03	0.14	0.43	1.88	(1)(2)(3)(4)
Open-Ended Lines	0.00170	0.00383	5.00	150.00	60.00	0.01	0.03	0.00	0.00	0.17	0.76	(1)(2)(3)(4)
Sampling Connections	0.01500	0.03375	5.00	10.00	10.00	0.06	0.26	0.00	0.01	0.13	0.57	(1)(2)(3)(4)
Total			**1533.00**	**650.00**	**585.00**	**7.08**	**31.02**	**0.20**	**0.89**	**4.25**	**18.61**	

Notes

1 - Ammonia Emissions are adjusted by 17/70 to account for difference in MW of NH3 and assumed MW basis of EPA Emmission Factor

2 - 35% CO in syngas thoughout system based on process modeling. It is conservative, as the Shift Reactors are immediately downstream of the quench.

3 - H2S Emission assume 1% by wt. H2S in syngas. This is based on process modeling.

4 - Ammonia emissions from urea processes are adjusted by 34/60 to reflect the mol % of ammonia in urea

Emissions Characterization - Feedstock

POINT SOURCE STACK PARAMETERS

1.	2.	3a.	3b.	4.	5.	6.	.7	8.	9.	10.	11.
Emissions units	Stack ID	UTM Easting (m)	UTM Northing (m)	Base Elevation (m)	Stack Height (m)	Modeled Diameter (m)	Stack Exit Temperature (F)	Stack Exit Flowrate (acfm)	Stack Exit Velocity (m/s)	Stack orientation (e.g., horizontal, rain cap)	Notes/References
Point Source(s)											
Railcar Unloading	SRC01	343,684	4,734,481	1,337	10.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Railcar Hopper to Railcar Conveyor	SRC02	343,687	4,734,485	1,337	5.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Railcar Conveyor to Silo Conveyors	SRC03	343,684	4,734,490	1,337	5.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Silo Conveyor to Stacker Conveyors	SRC04	343,647	4,734,587	1,337	2.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Silo 3 Vent	SRC05	343,627	4,734,589	1,337	57.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Silo 1 Vent	SRC06	343,657	4,734,601	1,337	57.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Silo 2 Vent	SRC07	343,632	4,734,667	1,337	57.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Silo 1 Reclaimer to Reclaim Conveyor	SRC08	343,622	4,734,604	1,337	53.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Silo2 Reclaimer to Reclaim Conveyor	SRC09	343,684	4,734,637	1,337	53.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Silo 3 Reclaimer to Reclaim Conveyor	SRC10	343,661	4,734,693	1,337	53.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Reclaim Conveyor to Rod Mill Hopper #1	SRC11	343,884	4,735,099	1,337	10.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Reclaim Conveyor to Rod Mill Hopper #2	SRC12	343,917	4,735,112	1,337	10.00	1.20	46.40	20,000	10	Vertical	(1)(2)(3)(5)
Fluxant Railcar Unloading	FUG	343,719	4,735,031	1,337	5.00					Fugitive	(3)(4)
Fluxant Hopper to Fluxant Silos	FUG	343,856	4,735,098	1,337	15.00					Fugitive	(3)(4)
Fluxant Silos to Rod Mill Hopper	FUG	343,898	4,735,111	1,337	10.00					Fugitive	(3)(4)
Slag Dewatering to Slag Storage Pile	FUG	343,983	4,735,203	1,337						Fugitive	(3)(4)
Slag Storage Pile	FUG	343,983	4,735,203	1,337	10.00					Fugitive	(3)(4)
Slag Storage Truck Loading	FUG	343,983	4,735,203	1,337						Fugitive	(3)(4)

Provide the stack inside diameter. If the stack is not circular, use the equivalent dimensions determined by Area = $d^2\pi/4$, where d is the stacks inner diameter.

Provide the stack exit temperature. Include documentation and justification for the exit temperature used.
Provide the stack exit flowrate. Include documentation and justification for the exit flowrate used.
Provide the stack exit velocity. Include documentation and justification for the exit velocity used.

Stack Data Notes/References:
1) REH has assumed individual baghouses for modeling analysis. Final design may group localized emission sources into fewer baghouses.
2) Baghouse vent parameters based on data from recent BACT determinations (Comanche Generating Station, Pueblo Colorado)
3) Temperature data assumed to be annual average temperature
4) Area or Fugitive Source
5) Engineering judgment was used to estimate vent heights give nearby structure heights

Emissions Characterization - Feedstock

SUMMARY OF EMISSIONS - POINT SOURCES

1.	2.	Material Processing Rates			Uncontrolled			Assumptions		3. PM		PM$_{10}$	
Emissions units	Stack ID	Max Hourly Throughput	Max Annual Throughput	Units	PM Emission Rate	PM10 Emission Rate	Units	Notes	Control Efficiency	lb/hr	T/yr	lb/hr	T/yr
Point Source(s)													
Railcar Unloading	SRC01	5,000	912,500	Tons	0.00174	0.00087	lb/ton	(1)(2)	99%	0.0870	0.0079	0.0435	0.0040
Railcar Hopper to Railcar Conveyor	SRC02	5,000	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)	99%	0.0860	0.0079	0.0407	0.0037
Railcar Conveyor to Silo Conveyors	SRC03	5,000	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0860	0.0079	0.0407	0.0037
Silo Conveyor to Stacker Conveyors	SRC04	5,000	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0860	0.0079	0.0407	0.0037
Silo 3 Vent	SRC05	5,000	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0860	0.0079	0.0407	0.0037
Silo 1 Vent	SRC06	5,000	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0860	0.0079	0.0407	0.0037
Silo 2 Vent	SRC07	5,000	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0860	0.0079	0.0407	0.0037
Silo 1 Reclaimer to Reclaim Conveyor	SRC08	104	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0018	0.0079	0.0008	0.0037
Silo2 Reclaimer to Reclaim Conveyor	SRC09	104	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0018	0.0079	0.0008	0.0037
Silo 3 Reclaimer to Reclaim Conveyor	SRC10	104	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0018	0.0079	0.0008	0.0037
Reclaim Conveyor to Rod Mill Hopper #1	SRC11	104	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0018	0.0079	0.0008	0.0037
Reclaim Conveyor to Rod Mill Hopper #2	SRC12	104	912,500	Tons	0.00172	0.00081	lb/ton	(1)(3)(4)	99%	0.0018	0.0079	0.0008	0.0037
Fluxant Railcar Unloading	FUG	250	91,250	Tons	0.00174	0.00087	lb/ton	(2)(5)(9)	75%	0.1088	0.0198	0.054	0.010
Fluxant Hopper to Fluxant Silos	FUG	250	91,250	Tons	0.00172	**0.00081**	lb/ton	(3)(5)(9)	**96%**	**0.0172**	**0.0031**	**0.0081**	**0.0015**
Fluxant Silo Vent(s)	**POINT**	**250**	**91,250**	**Tons**	**0.00099**	**0.00099**	lb/ton	**(10)(11)**	**99%**	**0.0025**	**0.0005**	**0.0025**	**0.0005**
Fluxant Silos to Rod Mill Hopper	FUG	10	91,250	Tons	0.00172	**0.00081**	lb/ton	(3)(5)**(9)**	**96%**	**0.0007**	**0.0031**	**0.0003**	**0.0015**
Slag Dewatering to Slag Storage Pile	FUG	24	211,700	Tons	0.00172	0.00081	lb/ton	(3)(6)	75%	0.0104	0.0455	0.0049	0.0215
Slag Storage Pile	FUG	24	211,700	Tons	0.15692	0.07846	lb/hr	(6)(7)(8)	75%	0.0392	0.1718	0.0196	0.0859
Slag Storage Truck Loading	FUG	24	211,700	Tons	0.00172	0.00081	lb/ton	(3)(6)	75%	0.0104	0.0455	0.0049	0.0215
Total FINAL 2009										**0.80**	**0.38**	**0.39**	**0.19**
Total SIE April 2008 Appl.										**0.89**	**0.42**	**0.43**	**0.20**

Notes

Emission Factor Source:
1) Maximum hourly feedrate based on maximum unloading rate of 5,000 tph. Maximum annual feedrate based conservatively on maximum gasifier consumption of 2,500 tpd
2) Emission factor from Electric Power Research Institute Report CS-3455 published in June 1984
3) Transfer point emissions factors from AP-42 Aggregate Handling And Storage Piles, where E=k(0.0032)(U/5)^1.3/(M/2)^1.4 (lb/ton). K = 0.74 for PM, and 0.35 for PM10
4) Feedstock assumed to range from 100% coal to 100% PetCoke and blends of each
Material Handling to all Silos assumes that each silo is used exclusively, which is conservative as three silos would mean an annual utilization of 33%
5) Fluxant requirements for single gasifier assumed to be less than 250 tpd and maximum hourly unloading rate equal to maximum daily requirement
6) Slag volume equal to 30 days storage maximum expected ash content (15% as received by wt.) plus fluxant
7) Wind erosion emission factors from AP-42 Industrial Wind Erosion, where maximum wind velocity assumed to be 26.4 m/s based on highest mile over a 45-year period
8) Slag storage in 10-meter, 3-sided concrete bunker. Slag density estimated at 2 tons/cubic meter.
9) DEQ. 96% control for conveyor transfer points - see AP-42 Section 11.19.2.2
10) DEQ. Maricopa uncontrolled EF (sand), Maricopa County Air Quality Department, Emission Inventory Help Sheet for Concrete Batch Plants, http://www.maricopa.gov/aq/divisions/planning_analysis/docs/2007_helpsheets/07_concrete.pdf
11) DEQ. Permit requires silo baghouse or cartridge filter with minimum 99% control

SOUTHEAST IDAHO ENERGY, LLC - P-2008.0066 APP Emissions Characterization - Steady State Operations - FINAL 2009 DEQ.XLS FEEDSTK Pt source Emissions

Emissions Characterization - Feedstock

SLAG STORAGE PILE CALCULATIONS

Assumptions:

Slag stored in 3-sided concrete bunker with maximum height equal to 10 meters.
Assume Daily Disturbance (N=365)
Maximum Ht of bunker walls is 4 meters
Density of slag is 2tons/m^3
Maximum Ash Content is 15%
Fluxant load it 250 tpd
Wind speed based on annual average of monthly maximum extremes reported in www.wrcc.dri.edu/cgi-bin/cliicd.pl?id24156 for years 1950 through 1995
Slag Storage = 30 days

Slag Volume Calculations

Fuel Feedrate	2,200 tpd	
Fluxant Feed	250 tpd	
Max Slag Prduction	580 tpd	17,400 Tons Stored
30 day Slag Storage	8,700 m^3	

Estimated Round Flat-top Storage Pile Dimensions

Max Height	10 meters
Bunker Length	29 metes
Surface Area	870 m^2

Maximum Windspeed Calculation

January	61 mph
February	57 mph
March	72 mph
April	61 mph
May	61 mph
June	50 mph
July	57 mph
August	54 mph
September	57 mph
October	54 mph
November	67 mph
December	57 mph
Average	59 mph
	26.38 m/s

Erosion Potential - Equation 3 AP-42 13.2.5

Friction Velocity	1.40 m/s	Eqn 4 - AP-42 13.2.5
Threshold Friction Velocity	1.33 m/s	Roadbed matieral from Table 13.2.5-2 AP-42 13.2.5
Erosion Potential	1.97 g/m^2-yr	
Disturbance Frequency	365.00 Daily Disturbance	
Emission Rate	71.24 g/hr	
Emission Rate	0.16 lbs/hr	
Emission Rate	0.69 tpy	

SOUTHEAST IDAHO ENERGY, LLC - P-2008.0066 APP Emissions Characterization - Steady State Operations - FINAL 2009 DEQ.XLS Slag Storage Pile Calculations

Appendix C – Modeling Analysis

MEMORANDUM

DATE:	January 30, 2009
BY:	Darrin Mehr, Air Quality Analyst, Air Program Cheryl Robinson, P.E., Air Quality Engineer, Air Program
THROUGH:	Kevin Schilling, Stationary Source Modeling Coordinator, Air Program

PROJECT NUMBER: P-2008.0066

SUBJECT:	Modeling Demonstration for Southeast Idaho Energy's Power County Advanced Energy Center, PTC Application for a Greenfield Facility near American Falls, Idaho – FINAL

1.0 Summary

Southeast Idaho Energy, LLC, a subsidiary of Refined Energy Holdings (SIE/REH) submitted a permit to Construct (PTC) application for the proposed Power County Advanced Energy Center (PCAEC) facility on July 24, 2007. This application was later withdrawn by the applicant. A new PTC application was submitted by SIE/REH on April 29, 2008.

The PCAEC will be a greenfield facility located southwest of American Falls, Idaho, along the Snake River. This proposed project is for a coal gasification plant that will produce ammonia, granulated urea, urea ammonium nitrate (UAN), and elemental sulfur.

The PCAEC is a *designated facility*, as defined in IDAPA 58.01.01.006, Rules for the Control of Air Pollution in Idaho (Rules). As shown in Section 3 of the statement of basis, the facility's potential to emit (PTE) of carbon monoxide (CO) and nitrogen oxides (NO_x) each exceed 100 tons per year (T/yr). The PCAEC is therefore a major facility under the New Source Review (NSR) Prevention of Significant Deterioration (PSD) program. Emissions of CO, NO_x, PM, and PM_{10} exceed the significant emissions thresholds, so each of these pollutants is subject to PSD requirements.

The proposed project is subject to review under Section 200 of the Rules. Section 205 of the Rules establishes the Permit to Construct (PTC) requirements for new major facilities for locations designated as attainment or unclassifiable for criteria air pollutants. Section 202.c of the Rules describes the requirements for the PSD analysis forthis proposed major facility, including effects on visibility in Class I areas and ambient monitoring requirements.

Section 203.02 of the Rules requires the facility to demonstrate compliance with the National Ambient Air Quality Standards (NAAQS). Section 210 of the Rules requires the facility to demonstrate compliance with the toxic air pollutants (TAPs) increments, which are listed in Sections 585 and 586 of the Rules.

SIE/REH performed the ambient air dispersion modeling analyses for this project to demonstrate compliance with NAAQS and TAPs. On behalf of SIE/REH, and at DEQ's request, Trinity Consultants performed a screening level visibility impact analysis for this project's impacts on the nearest Class I area, Craters of the Moon National Monument. The modeling analyses: 1) utilized appropriate methods and models; 2) were conducted using reasonably accurate or conservative model parameters and input data; 3) adhered to established DEQ guidelines for new source review dispersion modeling; 4) showed that predicted pollutant concentrations from emissions associated with the facility were below significant contribution levels (SCLs) or other applicable increments/standards at all ambient air locations.

Key assumptions and results that should be considered in the development of the permit are shown in Table 1.

Table 1. KEY ASSUMPTIONS USED IN MODELING ANALYSES	
Criteria/Assumption/Result	**Explanation/Consideration**
Construction and Operating Scenarios The permit application contained two distinct scenarios for collection and processing of sulfur compounds. Scenario 1 : Haldor Topsoe Wet Sulfuric Acid Plant This scenario was addressed by the original PTC application received on April 29, 2008. SIE deleted this option in Addendum No. 3 to their application. Scenario 2 : Claus Elemental Sulfur Plant This scenario was addressed by PTC Addendum 1 received on July 2, 2008.	The following permit conditions are recommended for the Claus elemental sulfur plant construction and operation scenario: • A Steam Superheater with a design heat input capacity of 250 MMBtu/hr or less will be constructed. • The Steam Superheater is allowed to combust Pressure Swing Adsorber tail gas or natural gas. • The Package Boiler is only allowed to combust natural gas under the Claus elemental sulfur plant scenario. The Package Boiler will only operate during startup and shutdown of the facility.
Backup Generator and Fire Water Pump Diesel-Fired Engines 2 MW generator (SRC25) and fire water pump engine (SRC26) were each modeled with unlimited daily operation at rated capacity, and at 100 hours per year at rated capacity.	Allowable operating hours for SRC25 and SRC 26 (each source) • 100 hours per year • 24 hours per day
Cooling Tower (SRC22) The drift rate directly affects the PM_{10} emission rate for the cooling tower source. The original cooling tower PM_{10} emission rate was reduced by 50% based on a revised drift rate guarantee from the manufacturer, SPX Technologies. The cooling tower drift eliminators will be designed with an elimination efficiency that will reduce mist of the circulating water flow rate to 0.0005% The Cooling Tower is designed with 7 individual vents with 1.29 million actual cubic feet per minute per vent. The vents will be located within a single cooling tower structure, and the 7 vents were modeled as a single point with an exhaust flow rate and exit diameter based on the individual vent exhaust flow rates and exit diameters.	The modeled emission rate for the Cooling Tower in the final July 30, 2008 modeling submittal was 1.5133 pounds per hour of PM_{10}. This emission rate is for the entire cooling tower system, not individual vents. PM_{10} emission rates for permitting purposes should not exceed: • 1.51 lb/hr, • 36.24 lb/day, and • 6.61 tons/yr.
Construction of Sources as Proposed in the Permit Application Emission rates used in the modeling were established using assumptions for control efficiencies for proposed air pollutant control equipment. Exhaust parameters used in the modeling demonstration are dependent upon the specific characteristics of the air pollution control equipment. Installation of pollution control equipment with different specifications may directly affect the air pollutant emission rates and the exhaust parameters for some sources. A change in equipment from what has been proposed in the permit application would require the applicant to revise the emission rates and exhaust parameters and remodel the proposed project to assess changes to predicted ambient concentrations.	The permit should contain conditions requiring construction and operation of emission sources and pollution control equipment as proposed in permit application. If the permittee elects to install equipment with different specifications than those contained in the application, any increases in air pollutant emissions should be quantified and any alterations to exhaust parameters should be identified and included in revised ambient air dispersion analyses to verify that facility-wide ambient impacts will remain below the significant contribution levels. A full impact analysis, including impacts from co-contributing sources and accounting for background air pollutant levels, would be required for any pollutant having an impact from emissions from the SIE/REH facility that exceeds a significant contribution level (see Table 2).

2.0 Background Information

2.1 Applicable Air Quality Impact Limits and Modeling Requirements

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 *Area Classification*

The PCAEC facility will be located in Power County, which is designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}).

There are no Class I areas within 10 kilometers of the facility. The nearest Class I area is Craters of the Moon National Monument, which is located approximately 74 kilometers northwest of the proposed facility.

2.1.2 *Significant and Full Impact Analyses*

If estimated maximum pollutant impacts to ambient air from the emissions sources at the facility exceed the significant contribution levels (SCLs) of Section 006.102 of the Rules, then a full impact analysis is necessary to demonstrate compliance with Section 203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions, and emissions from any identified co-contributing sources, to DEQ-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location and the area of significant impact. The resulting maximum pollutant concentrations in ambient air are then compared to the National Ambient Air Quality Standards (NAAQS) listed in Table 2. Table 2 also lists SCLs and specifies the modeled value that must be used for comparison to the NAAQS.

Table 2. CRITERIA AIR POLLUTANTS APPLICABLE REGULATORY LIMITS

Pollutant	Averaging Period	Significant Contribution Levels[a] ($\mu g/m^3$)[b]	Class II NAAQS Regulatory Limit[c] ($\mu g/m^3$)	Modeled Value Used[d]
PM_{10}[e]	Annual	1.0	50[f]	Maximum 1[st] highest[g]
	24-hour	5.0	150[h]	Maximum 6[th] highest[i]
Carbon monoxide (CO)	8-hour	500	10,000[j]	Maximum 2[nd] highest[g]
	1-hour	2,000	40,000[j]	Maximum 2[nd] highest[g]
Sulfur Dioxide (SO_2)	Annual	1.0	80[f]	Maximum 1[st] highest[g]
	24-hour	5	365[j]	Maximum 2[nd] highest[g]
	3-hour	25	1,300[j]	Maximum 2[nd] highest[g]
Nitrogen Dioxide (NO_2)	Annual	1.0	100[f]	Maximum 1[st] highest[g]
Lead (Pb)	Quarterly	NA	1.5[h]	Maximum 1[st] highest[g]

[a] Idaho Air Rules Section 006.102

[b] Micrograms per cubic meter

[c] National Ambient Air Quality Standards specified by Idaho Air Rules Section 577 for criteria pollutants

[d] The maximum 1[st] highest modeled value is always used for significant impact analysis

[e] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers

[f] Never expected to be exceeded in any calendar year

[g] Concentration at any modeled receptor

[h] Never expected to be exceeded more than once in any calendar year

[i] Concentration at any modeled receptor when using five years of meteorological data

3

[j] Not to be exceeded more than once per year

Demonstration of compliance with $PM_{2.5}$ standards was done using PM_{10} as a surrogate. See the Response to Comments document for this permit for a more detailed discussion regarding $PM_{2.5}$ compliance.

2.1.3 TAPs Analyses

The increase in emissions from the proposed project are required to demonstrate compliance with the toxic air pollutant (TAP) increments, with an ambient impact dispersion analysis required for any TAP having a requested potential emission rate that exceeds the screening emission rate limit (EL) specified by Idaho Air Rules Section 585 or 586.

This project is for a greenfield facility. All TAPs emissions associated with this project are subject to the requirements of the TAPs regulations. The analyses submitted in the application and supplemental addenda included TAPs compliance demonstration per the requirements of Section 210 of the Rules.

2.1.4 PSD Program Analyses

Section 202.c of the Rules establishes the PTC application requirements for a proposed major PSD source or a major modification within an area that has been designated as attainment or as unclassifiable for regulated air pollutants under the Clean Air Act. The requirements for an attainment or unclassifiable area PSD permit application, as specified in Section 202.c, and a description of how these requirements were addressed for this project are listed below.

202.c For any new major facility or major modification in an attainment or unclassifiable area for any regulated air pollutant. (4-6-05)

202.c.i. A description of the system of continuous emission control proposed for the new major facility or major modification, emission estimates, and other information as necessary to determine that the best available control technology would be applied.

See the BACT analysis provided in the SIE application and addenda, and the DEQ Statement of Basis.

202.c.ii. An analysis of the effect on air quality by the new major facility or major modification, including meteorological and topographical data necessary to estimate such effects.

See Section 3.4.1 of this memorandum for the air quality impacts of criteria pollutants emitted from the SIE/REH facility.

202.c.iii. An analysis of the effect on air quality projected for the area as a result of general commercial, residential, industrial, and other growth associated with the new major facility or major modification.

See Section 3.5.3 of this memorandum for the impacts of resulting growth on air quality.

202.c.iv. A description of the nature, extent, and air quality effects of any or all general commercial, residential, industrial, and other growth which has occurred since August 7, 1977, in the area the new major facility or major modification would affect.

See Section 3.5.3 of this memorandum for the air quality impacts of growth since 1977.

202.c.v. An analysis of the impairment to visibility, soils, and vegetation that would occur as a result of the new major facility or major modification and general commercial, residential, industrial, and other growth associated with establishment of the new major facility or major modification. The owner or operator need not provide an analysis of the impact on vegetation or soils having no significant commercial or recreational value.

See Section 3.5.2 of his memorandum for a description of the soil and vegetation analysis. The general visibility analyses are described in Section 3.5.6.

202.c.vi. An analysis of the impairment to visibility of any federal Class I area, Class I area designated by the Department, or integral vista of any mandatory federal Class I area that the new major facility or major modification would affect.

See Section 3.5.1 of this memorandum for a description of the Class I visibility analyses.

202.c.vii. An analysis of the existing ambient air quality in the area that the new major facility or major modification would affect for each regulated air pollutant that a new major facility would emit in significant amounts or for which a major modification would result in a significant net emissions increase.

Since modeled impacts from allowable emissions associated with operation of the proposed facility are below thresholds established in Section 202.c.viii of the Rules (below), this analysis was not required.

202.c.viii. Ambient analyses as specified in Subsections 202.01c.vii., 202.01c.ix., 202.01c.x., and 202.01c.xii., may not be required if the projected increases in ambient concentrations or existing ambient concentrations of a particular regulated air pollutant in any area that the new major facility or major modification would affect are less than the following amounts, or the regulated air pollutant is not listed herein: carbon monoxide - five hundred and seventy-five (575) micrograms per cubic meter, eight (8) hour average; nitrogen dioxide - fourteen (14) micrograms per cubic meter, annual average; PM-10 - ten (10) micrograms per cubic meter, twenty-four (24) hour average; sulfur dioxide - thirteen (13) micrograms per cubic meter, twenty-four (24) hour average; ozone - any net increase of one hundred (100) tons per year or more of volatile organic compounds, as a measure of ozone; lead - one-tenth (0.1) of a microgram per cubic meter, calendar quarterly average; mercury - twenty-five hundredths (0.25) of a microgram per cubic meter, twenty-four (24) hour average; beryllium - one-thousandth (0.001) of a microgram per cubic meter, twenty-four (24) hour average; fluorides - twenty-five hundredths (0.25) of a microgram per cubic meter, twenty-four (24) hour average; vinyl chloride - fifteen (15) micrograms per cubic meter, twenty-four (24) hour average; hydrogen sulfide - two-tenths (0.2) of a microgram per cubic meter, one (1) hour average.

202.c.ix. For any regulated air pollutant which has an ambient air quality standard, the analysis shall include continuous air monitoring data, gathered over the year preceding the submittal of the application, unless the Department determines that a complete and adequate analysis can be accomplished with monitoring data gathered over a period shorter than one (1) year, but not less than four (4) months, which is adequate for determining whether the emissions of that regulated air pollutant would cause or contribute to a violation of the ambient air quality standard or any prevention of significant deterioration (PSD) increment.

Since modeled impacts from allowable emissions associated with operation of the proposed facility are below thresholds established in Section 202.c.viii of the Rules (above), this analysis was not required.

202.c.x. For any regulated air pollutant which does not have an ambient air quality standard, the analysis shall contain such air quality monitoring data that the Department determines is necessary to assess ambient air quality for that air pollutant in any area that the emissions of that air pollutant would affect.

Since modeled impacts from allowable emissions associated with operation of the proposed facility are below thresholds established in Section 202.c.viii of the Rules (above), this analysis was not required.

202.c.xi. If requested by the Department, monitoring of visibility in any Class I area the proposed new major facility or major modification would affect.

202.c.xii. Operation of monitoring stations shall meet the requirements of Appendix B to 40 CFR Part 58 or such other requirements as extensive as those set forth in Appendix B as may be approved by the Department.

Since modeled impacts from allowable emissions associated with operation of the proposed facility are below thresholds established in Section 202.c.viii of the Rules (above), visibility monitoring was not required.

2.2 Background Concentrations

Background concentration values were not used in the ambient air quality impact analyses because the maximum modeled impacts from the proposed facility were below significant contribution levels (SCLs) listed in Table 2.

3.0 Modeling Impact Assessment

3.1 Modeling Methodology

Table 3 provides a summary of the modeling parameters used in the submitted modeling analyses.

Table 3. MODELING PARAMETERS		
Parameter	**Description/ Values**	**Documentation/Additional Description**
Model	AERMOD	AERMOD, Version 07026
Meteorological data	January 2001 through December 2005	Five years of Aberdeen surface data were used. The surface met data was collected by the Idaho National Laboratory at a height of 15 meters. These data were originally submitted by Geomatrix in support of an air dispersion analysis for a project in Aberdeen, Idaho. Boise airport upper air data for the same period were used for processing in AERMET. The meteorological data files for this project were supplied to SIE/REH by DEQ.
Land Use (urban or rural)	Rural	Urban heat rise coefficients were not used. The application stated that greater than 50% of the land surrounding the proposed site consists of low-level residential buildings and agricultural land. DEQ verified the appropriate land use designation is rural.
Terrain	Considered	3-dimensional receptor coordinates were obtained from USGS DEM files and used to establish elevation of ground level receptors. Eighty-eight 7.5-minute DEM files were used in the analyses.
Building downwash	Downwash algorithm	Building dimensions obtained from the submitted facility plot plan. BPIP-PRIME and AERMOD, which contains the PRIME algorithm, were used to evaluate downwash effects.
Receptor grid	Grid 1	50-meter spacing along the ambient air boundary
	Grid 2	100-meter spacing in a 10 kilometer (east) by 10 kilometer (north) nested grid centered on the facility
	Grid 3	250-meter spacing in a 20 kilometer (east) by 20 kilometer (north) nested grid centered on Grid 2
	Grid 4	500-meter spacing in a 40 kilometer (east) by 40 kilometer (north) nested grid centered on Grid 3
	Grid 5	1,000-meter spacing in a 100 kilometer (east) by 100 kilometer (north) nested grid centered on Grid 4

Sulfur Production:

SIE/REH's April 2008 application contained two distinct construction and operating scenarios. The first scenario included a wet sulfuric acid (WSA) plant using the Haldor-Topsoe technology. This sulfuric acid plant had one vent associated with it (SRC18). SIE/REH deleted this option in Addendum No. 3 to their application.

The second scenario—the only remaining option—consists of the construction and operation of an elemental sulfur production unit using Claus technology. The elemental Claus sulfur unit itself does not have any point of airborne release of emissions, so it is not included in the modeling demonstration. All tail gas from the Claus unit will be directed back to the Selexol Acid Gas Recovery unit for reprocessing to remove sulfur compounds. This is a closed loop process.

In addition to the Claus elemental sulfur plant, a steam superheater boiler will be constructed to provide additional steam production capacity for the facility. The steam superheater boiler will combust a fuel mixture of pressure swing adsorber (PSA) tail gas and natural gas. Only natural gas will be combusted in the package boiler, which will be used only during startup and shutdown. The package boiler operation will be ramped down as the steam superheater boiler comes on line, so that the combined operations of the boilers do not exceed 250 million British thermal units per hour (MMBtu/hr). Both the steam superheater boiler and the package boiler will be sized up to a maximum heat input capacity of 250 MMBtu/hr.

Multiple Operating Loads Evaluated:

SIE/REH modeled several sources with emissions and exhaust parameters reflecting varying operating loads that may occur during normal operation of the facility. To determine the maximum ambient impacts from these sources, varying levels of capacity were assumed, and the exhaust parameters and emission rates for each operation level were estimated and used in separate modeling runs. The highest predicted ambient concentration from each operating load was used to select the operating scenario reflected in the final ambient impact analyses. SIE/REH modeling results indicated maximum impacts for each varying load source were obtained using emission rates and exhaust parameters for operations at 100% load. These sources included the package boiler, the steam superheater boiler, and the nitric acid plant.

3.1.1 Modeling protocol

A modeling protocol was submitted to DEQ by SIE/REH in April 2007. The modeling protocol was approved, with comments, by DEQ on November 8, 2007. The initial permit application included Conoco-Philips coal/coke gasifier systems and a Fischer-Tropsch liquid transportation fuels reformulation plant. The Fischer-Tropsch liquid transportation fuels option was dropped by SIE/REH, and the gasifier technology supplier was switched to General Electric. The initial permit application was withdrawn.

After the initial permit application was withdrawn by SIE/REH, a second, updated modeling protocol was submitted with the permit application package on April 29, 2008. DEQ did not provide a modeling protocol approval letter specifically for the updated modeling protocol. Modeling was conducted using methods documented in the modeling protocol and the *State of Idaho Air Quality Modeling Guideline*.

3.1.2 Model Selection

AERMOD was used by SIE/REH to conduct the ambient air analyses. DEQ determined AERMOD is the most-appropriate model for this project, considering regional meteorology, terrain, and the configuration of the proposed industrial facility.

3.1.3 Meteorological Data

Two existing surface meteorological data sets were identified as potentially representative for the proposed facility location near American falls: 1) an Idaho National Laboratory station in Aberdeen, Idaho, about 22 kilometers north-northwest of the site; 2) the National Weather Service (NWS) station at the Pocatello, Idaho, airport, about 30 kilometers northwest of the site. DEQ determined the Aberdeen site is more representative of the SIE/REH site. The Pocatello airport site is influenced by the mountains immediately to the south and the Portneuf River valley to the southeast. The Aberdeen site is closer to the proposed SIE/REH site than the Pocatello site, and is not subject to meteorologically-affecting terrain differing from that of the SIE/REH site. DEQ determined meteorological data from the Aberdeen site are adequately representative of conditions at the proposed SIE/REH facility location. Upper air data are not available for the southeast Idaho. Therefore, Boise upper air data were used to accompany the Aberdeen surface data. These upper air data are reasonably representative since both locations are within the Snake River valley system.

Five years of model-ready meteorological data, processed through the preprocessor AERMET, were provided to SIE/REH by DEQ. These data were processed by Geomatrix Consultants, Inc., in support of a permit application submitted to DEQ in January, 2008. The data were collected for the period 2001-2005.

AERMOD requires additional meteorological variables and geophysical parameters to estimate surface energy fluxes and construct boundary layer profiles. Three surface characteristics, including surface roughness length, albedo, and Bowen ratio, are needed to calculate the additional variables. These characteristics are input to AERMET on a sector-by-sector basis, extending out three kilometers from the location where the data were collected.

The three surface characteristics are a function of climate and land use. USGS 1992 National Land Cover (NLCD92) land use data, with a 30-meter grid size and over 30 land use categories, were used to determine the surface characteristics for 12 upwind sectors surrounding the meteorological monitoring site. Geomatrix used the MAKEGEO land use processor within the CALPUFF modeling system to calculate arithmetic averages for albedo and Bowen ratio, and geometric averages for surface roughness, on an annual basis for each sector.

AERMET (version 06341) was then used to combine the surface meteorological data with twice daily upper air soundings from Boise Airport, and to generate the additional variables from the sector-specific assignment of surface characteristics.

3.1.4 Terrain Effects

The modeling analyses conducted by SIE/REH considered elevated terrain. AERMAP was used by SIE/REH to determine the actual elevation of each receptor and the controlling hill height elevation from United Geological Survey (USGS) digital elevation map (DEM) files for the area surrounding the facility. Elevations of emission sources, buildings, and receptors were developed based on surrounding terrain elevations as extracted from the DEM files.

3.1.5 Facility Layout

DEQ verified proper identification of the facility boundary and buildings on the site by comparing the modeling input file to the scaled plot plan submitted with the application.

3.1.6 Building Downwash

Plume downwash effects caused by structures at the facility were accounted for in the modeling analyses. The Building Profile Input Program for the Plume Rise Model Enhancements algorithm (BPIP-PRIME) was used by the applicant to calculate direction-specific building dimensions and Good Engineering Practice (GEP) stack height information from building dimensions/configurations and emissions release parameters. The output from BPIP-PRIME was used as input to AERMOD to account for building-induced downwash effects.

3.1.7 Ambient Air Boundary

Ambient air was determined to exist for all areas immediately exterior to the facility's property boundary. SIE/REH stated in the application that the entire facility will be fenced. An existing public county road will be removed and rerouted around the facility's property boundary for this project. The general public will have no access to any area within the fenced property. Therefore, the property boundary is established as the ambient air boundary, as per methods specified in the *State of Idaho Air Quality Modeling Guideline*.

3.1.8 Receptor Network

The receptor grids used by SIE/REH met the minimum recommendations specified in the *State of Idaho Air Quality Modeling Guideline*. DEQ determined the receptor grid was adequate to reasonably resolve the maximum modeled ambient impacts.

3.2 Emission Rates

3.2.1 *Fugitive Emissions*

With DEQ's prior approval, the modeling analysis did not include emissions of fugitive PM_{10} or CO. Emissions from silo filling were not included in the application, but the permit requires that baghouse or cartridge filter controls with a minimum 99% capture efficiency for PM/PM_{10} be installed on fluxant silo(s). As shown in Table 4, the PM_{10} emissions from fluxant and slag handling are negligible, comprising less than 1.0% of the facility-wide 24-hour PM_{10} emissions and less than 0.3% of the facility-wide annual PM_{10} emissions. These fugitive PM_{10} sources were not included in the modeling demonstration because in DEQ's judgment, impacts attributable to these small emission rates should not affect the maximum concentrations for the significant contribution analyses.

Fugitive emissions from wind erosion from feedstock railcars awaiting unloading at the facility and from bulk loading of granular urea were determined to be negligible (see the Response to Comments document).

Table 4. FUGITIVE PM10 EMISSION RATES		
Source ID	**Emission Rate (SIE Application)**	
	PM_{10} (lb/hr)	**PM_{10} (T/yr)**
Fluxant Railcar Unloading	0.054	0.010
Fluxant Hopper to Fluxant Silos	0.051	0.0093
Fluxant Silo Filling[a]	Not given	Not given
Fluxant Silos to Rod Mill Hopper	0.0021	0.0093
Slag Dewatering to Slag Storage Pile	0.005	0.022
Slag Storage Pile	0.020	0.086
Slag Storage Truck Loading	0.005	0.022
Total Fugitives[a]	**0.09**	**0.14**
Total Facility-Wide PM_{10} Emissions	**14.3**	**60.2**

[a] Emissions from the fluxant silo vents will be point sources in the as-built condition.

As shown in Section 3 of the statement of basis, fugitive emissions of CO were estimated in the April 2008 application to be 7.08 lb/hr and 31.02 T/yr, or about 12.7% of the facility-wide hourly emissions of 55.6 lb/hr and 13.3% of the facility-wide annual emissions of 233.6 T/yr. Fugitive emissions of CO occur primarily in the gasification block from piping, equipment, and valves located between the gasifier and the final stage of the sour-water shift reactor.

DEQ determined that fugitive CO emissions, when combined with other CO emissions sources at the facility, could not reasonably be expected to cause ambient concentrations in excess of significant contribution levels. This determination was based on the following:

- CO fugitive emissions are only a small fraction of total CO emissions.
- CO fugitive emissions are likely overestimated by a substantial amount.
- The maximum impact from non-fugitive CO sources is only 15% of the significant contribution level for 1-hour averaged CO and 9% of the significant contribution level for 8-hour averaged CO.

- CO fugitive sources are at least several hundred feet from the ambient air boundary. Considerable dispersion will occur between the point of release and any ambient air locations.

3.2.2 Modeled Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application. The following approach was used for SIE/REH's modeling:

- All modeled criteria air pollutant and TAP emissions rates were equal to or greater than the facility's emissions calculated in the PTC application, requested permit allowable emission rates, and BACT limits imposed in the air quality permit.

The emission rates in Tables 5, 6, and 7 contain the maximum emissions for all variable load sources. The variable load sources were determined to have their maximum ambient impacts at 100% operating loads. See Appendix D, in the table titled "Emissions Characterization - Part Load Operation" in SIE/REH's permit application for the emission estimates associated with partial load.

PM_{10} emission rates include condensables, and none of the processes at the PCAEC are expected to emit PM_{10} in the form of mists. See the Response to Comments document for a more detailed discussion.

Lead emissions listed in SIE/REH's modeling demonstration were approximately 1.29E-04 lb/hr. At 8,760 hours per year the project's lead emission rate equals 1.12 pounds per year. These emissions are below the modeling threshold levels of 100 pounds per month and 0.6 tons per year (or 1,200 pounds per year). Therefore, a project-specific air impact analysis for lead was not required.

The maximum short-term emission rates used to determine compliance with standards having an averaging period of 24 hours per day or less are listed in Table 5. The applicant set these emission rates to be equal to the maximum 1-hour emission rates, reflecting an assumption that equipment operates 24 hours per day at maximum capacity. Where permit limits differ from the modeled emission rate, the limits are included in the table for comparison, with the permit limit shown in parenthesis. PM_{10} BACT limits set in the permit for feedstock handling are significantly less than the emissions rates used to demonstrate compliance, as shown in the table. The CO BACT limit for the acid gas removal CO_2 stream reflects a 95% destruction efficiency for the thermal oxidizer compared to the 90% assumed in the April 2008 permit application. The increase in the thermal oxidizer efficiency also results in a slight increase in the SO_2 emissions from the acid gas removal CO_2 vent.

Table 5. MODELED CRITERIA POLLUTANT SHORT-TERM EMISSIONS RATES

Source ID	Description	Emission Rates (lb/hr[a])		
		PM_{10}[b]	SO_2[c], 3-hr avg and 24-hr avg	CO, 1-hr avg and 8-hr avg
SRC01	Railcar unloading baghouse vent	0.0435	---[e]	---
SRC02	Rail hopper—railcar conveyor baghouse vent	0.0407	---	---
SRC03	Railcar conveyor—silo conveyor baghouse vent	0.0407	---	---
SCR04	Silo conveyor—stacker conveyor baghouse vent	0.0407	---	---
SRC05	Coal/petcoke storage silo 3 baghouse vent	0.0407	---	---
SRC06	Coal/petcoke storage silo 1 baghouse vent	0.0407	---	---
SRC07	Coal/petcoke storage silo 2 baghouse vent	0.0407	---	---
SRC08	Coal/petcoke silo #1 reclaimer – reclaim conveyor #1 baghouse vent	0.0008	---	---
SRC09	Coal/petcoke silo #2 reclaimer – reclaim conveyor #2 baghouse vent	0.0008	---	---
SRC10	Coal/petcoke silo #3 reclaimer – reclaim conveyor #3 baghouse vent	0.0008	---	---
SRC11	Reclaim conveyor #1 – rod mill hopper baghouse vent	0.0008	---	---

Table 5. MODELED CRITERIA POLLUTANT SHORT-TERM EMISSIONS RATES				
Source ID	Description	Emission Rates (lb/hr[a])		
		PM_{10}[b]	SO_2[c], 3-hr avg and 24-hr avg	CO, 1-hr avg and 8-hr avg
SRC12	Reclaim conveyor #2 – rod mill hopper baghouse vent	0.0008	---	---
SRC13	Air separation unit (ASU) regen heater	0.00075	5.87E-05	0.0083
SRC14	Gasifier #1 heater vent[f]	0.067	0.053	0.74
SRC15	Gasifier #2 heater vent[f]	0.067	0.053	0.74
SRC16	Gasifier flare	0.011	0.0083	0.51
SRC17	Selexol acid gas removal CO_2 vent	---	**3.57 (3.76)**	**17.33 (8.66)**
SRC18	Sulfuric acid vent (DELETED)	---	---	---
SRC19	Urea granulation vent	9.00	---	---
SRC20	Nitric acid unit tail gas vent	---	---	---
SRC21	Process flare	0.058	0.0084	1.30
SRC22	Cooling tower	**3.02 (1.51)**	---	---
SRC23	Urea melt plant vent	---	---	---
SRC24	Package boiler	1.25	1.43	18.50
SRC25	2 megawatt emergency generator	0.154	0.979	1.71
SRC26	500 kW diesel-fired emergency fire pump engine	0.027	0.256	0.59
SRC27	Ammonia storage flare	0.0055	0.0041	0.25
SRC29	Ammonium nitrate neutralizer vent	1.49	---	---
SRC30	Zero liquid discharge system	0.25	---	---
SRC31	Steam superheater boiler	1.25	1.43	18.50

[a] Pounds per hour

[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers, 24-hour averaging period

[c] Sulfur dioxide

[d] Carbon monoxide

[e] --- = pollutant not emitted by this source

[f] During normal operations only one gasifier heater will be operated to maintain the standby gasifier at a standby temperature.

Compliance with annual standards was demonstrated using the hourly emission rates listed in Table 6. Except for the emergency generators, the applicant set the annual average pound per hour emission rates to be equal to the maximum 1-hour emission rates, reflecting an assumption that equipment operates 8,760 hours per year at maximum capacity. Annual pound per hour emission rates for the generators are based on operating each of these generators for 100 hours per year for routine maintenance and testing. See Table 5 for a comparison of the modeled emission rates and the permit limits.

Table 6. MODELED CRITERIA ANNUAL EMISSIONS RATES				
Source ID	Description	Emission Rates (lb/hr[a])		
		PM_{10}[b]	SO_2[c]	NO_2[d]
SRC01	Railcar unloading baghouse vent	0.0435	---[e]	---
SRC02	Rail hopper—railcar conveyor baghouse vent	0.0407	---	---
SRC03	Railcar conveyor—silo conveyor baghouse vent	0.0407	---	---
SCR04	Silo conveyor—stacker conveyor baghouse vent	0.0407	---	---
SRC05	Coal/petcoke storage silo 3 baghouse vent	0.0407	---	---
SRC06	Coal/petcoke storage silo 1 baghouse vent	0.0407	---	---
SRC07	Coal/petcoke storage silo 2 baghouse vent	0.0407	---	---
SRC08	Coal/petcoke silo #1 reclaimer – reclaim conveyor #1 baghouse vent	0.0008	---	---

Table 6. MODELED CRITERIA ANNUAL EMISSIONS RATES				
Source ID	Description	Emission Rates (lb/hr[a])		
		PM_{10}[b]	SO_2[c]	NO_2[d]
SRC09	Coal/petcoke silo #2 reclaimer – reclaim conveyor #2 baghouse vent	0.0008	---	---
SRC10	Coal/petcoke silo #3 reclaimer – reclaim conveyor #3 baghouse vent	0.0008	---	---
SRC11	Reclaim conveyor #1 – rod mill hopper baghouse vent	0.0008	---	---
SRC12	Reclaim conveyor #2 – rod mill hopper baghouse vent	0.0008	---	---
SRC13	Air separation unit regen heater	0.00075	5.87E-05	0.0049
SRC14	Gasifier #1 heater vent	0.067	0.053	0.88
SRC15	Gasifier #2 heater vent	0.067	0.053	0.88
SRC16	Gasifier flare	0.011	0.0083	0.10
SRC17	Selexol acid gas removal CO_2 vent	---	3.57	0.88
SRC18	Sulfuric acid vent (DELETED)	---	---	---
SRC19	Urea granulation vent	9.00	---	---
SRC20	Nitric acid unit tail gas vent	---	---	15.33
SRC21	Process flare	0.058	0.0084	1.31
SRC22	Cooling tower	1.51	---	---
SRC23	Urea melt plant vent	---	---	---
SRC24	Package boiler	1.25	1.43	5.00
SRC25	2 megawatt emergency backup generator	0.0017	0.011	0.363
SRC26	500 kW diesel-fired emergency firewater pump engine	0.00032	0.0029	0.097
SRC27	Ammonia storage flare	0.0055	0.0041	0.050
SRC29	Ammonium nitrate neutralizer vent	1.49	---	---
SRC30	Zero liquid discharge system	0.25	---	---
SRC31	Steam superheater boiler	1.25	1.43	5.00

[a] Pounds per hour

[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers

[c] Nitrogen dioxide

[d] Sulfur dioxide

[e] --- = pollutant not emitted from this source

The non-carcinogenic toxic air pollutant (TAP) 24-hour average emission rates listed below in Table 7 were modeled to demonstrate compliance with the applicable acceptable ambient concentration (AAC) increments. The carcinogenic TAP annual-average emissions listed below in Table 8 were modeled to determine compliance with the applicable acceptable ambient concentration for carcinogens (AACC) increments. Emissions of all other TAPs were estimated to be below emissions screening levels (ELs) listed in Sections 585 and 586 of the Rules, and air impact analyses were not required.

The emission rate shown in parentheses for carbonyl sulfide (COS) emissions from the acid gas removal CO_2 vent reflects the COS emission rate with the thermal oxidizer efficiency increase to 95% compared to the 90% assumed in the application.

Table 7. MODELED NON-CARCINOGENIC TOXIC AIR POLLUTANTS EMISSIONS RATES						
Source ID	Description	Ammonia (lb/hr)	Carbonyl Sulfide (lb/hr)	Crystalline Silica (lb/hr)	Nitric Acid (lb/hr)	Nitrous Oxide (N_2O) (lb/hr)
SRC01 - SRC12, Fluxant Silo, FUG	Coal and fluxant handling	---[b]	---	0.062 + 0.052 = 0.114[c]	---	---
SRC17	Selexol acid gas removal CO_2 vent	---	**0.37 (0.19)**	---	---	---
SRC18	Sulfuric acid vent	---	---	---	---	---

	(DELETED)					
SRC19	Urea granulation vent	77.14	---	---	---	---
SRC20	Nitric acid unit tail gas vent	2.19	---	---	0.44	88
SRC21	Process flare	4.37	---	---	---	---
SRC23	Urea melt plant vent	30.24	---	---	---	---
SRC29	Ammonium nitrate neutralizer vent	23.81	---	---	0.50	---
SRC31	Steam superheater	3.40	---	---	---	---

[a] Pounds per hour

[b] --- =Pollutant is not emitted by this source

[c] See the Response to Comments document for a detailed discussion of these emissions.

Table 8. MODELED CARCINOGENIC TOXIC AIR POLLUTANTS EMISSIONS RATES							
Source ID	**Description**	**Arsenic (lb/hr[a])**	**Benzene (lb/hr)**	**Cadmium (lb/hr)**	**Formaldehyde (lb/hr)**	**Nickel (lb/hr)**	**Polyaromatic Hydrocarbons (lb/hr)**
SRC13	Air separation unit regen heater	1.96E-06	2.06E-07	1.08E-07	7.35E-06	2.06E-07	---[c]
SRC14	Gasifier #1 heater vent[b]	1.76E-06	1.85E-05	9.68E-06	6.62E-04	1.85E-05	---
SRC15	Gasifier #2 heater vent[b]	1.76E-06	1.85E-05	9.68E-06	6.62E-04	1.85E-05	---
SRC16	Gasifier flare	2.94E-07	3.09E-06	1.62E-06	1.10E-04	3.09E-06	---
SRC21	Process flare	2.94E-07	3.09E-06	1.62E-06	1.10E-04	3.09E-06	---
SRC24	Package boiler	4.90E-05	5.15E-04	2.70E-04	1.84E-02	5.15E-04	---
SRC25	2 MW emergency generator	---	1.71E-04	---	1.74E-05	NA	4.67E-05
SRC26	500 kW diesel-fired emergency fire pump engine	---	4.50E-05	---	4.59E-06	NA	1.23E-05
SRC27	Ammonia storage flare	1.47E-07	1.55E-06	8.10E-07	5.52E-05	1.55E-06	---
SRC31	Steam superheater boiler	4.90E-05	5.15E-04	2.70E-04	1.84E-02	5.15E-04	---

[a] Pounds per hour

[b] Either Gasifier #1 or Gasifier #2 will be operating at any time. The other gasifier will be on standby.

[c] --- =Pollutant is not emitted by this source

3. 3 Emission Release Parameters

Table 9 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity for point sources. Documentation on the exhaust parameters indicated emission source data were obtained from design specifications for similar projects and the PCAEC design contractors and equipment vendors.

Several individual emissions units may operate at varying levels of operational design capacity. Exhaust parameters of temperature and exit velocity are often dependant upon the operation level of these sources. SIE/REH modeled these sources under varying operating levels and evaluated the maximum ambient impacts, and determined that the maximum predicted ambient impacts for all sources occurred during 100% operational load. Table 9 reflects the exhaust parameters for 100% load conditions. The variable load sources include the package boiler (SRC24), the steam superheater boiler (SRC31), and the nitric acid plant (SRC20).

All point sources were modeled as vertical, uninterrupted releases. No source emits with a horizontal stack or a raincap. Values used in the analyses appeared reasonable and within expected ranges for the assumptions used in the submitted analyses.

Table 9. POINT SOURCE STACK PARAMETERS					
Releas e Point	**Description**	**Stack Heigh t (m)[a]**	**Modeled Stack Diamete r (m)**	**Stack Gas Flow Temperatur e (K)[b]**	**Stack Gas Flow Velocity (m/sec)[c]**
SRC01	Railcar unloading baghouse	10	1.2	281.15	10.02
SRC02	Rail hopper—railcar conveyor baghouse	5	1.2	281.15	10.02
SRC03	Railcar conveyor—silo conveyor baghouse	5	1.2	281.15	10.02
SCR04	Silo conveyor to stacker conveyors	2	1.2	281.15	10.02
SRC05	Coal/petcoke storage silo 3 baghouse vent	57	1.2	281.15	10.02
SRC06	Coal/petcoke storage silo 1 baghouse vent	57	1.2	281.15	10.02
SRC07	Coal/petcoke storage silo 2 baghouse vent	57	1.2	281.15	10.02
SRC08	Coal/petcoke silo #1 reclaimer – reclaim conveyor #1 baghouse vent	53	1.2	281.15	10.02
SRC09	Coal/petcoke silo #2 reclaimer – reclaim conveyor #2 baghouse vent	53	1.2	281.15	10.02
SRC10	Coal/petcoke silo #3 reclaimer – reclaim conveyor #3 baghouse vent	53	1.2	281.15	10.02
SRC11	Reclaim conveyor #1 – rod mill hopper baghouse vent	10	1.2	281.15	10.02
SRC12	Reclaim conveyor #2 – rod mill hopper baghouse vent	10	1.2	281.15	10.02
SRC13	Air separation unit regen heater	4	0.05	355	9
SRC14	Gasifier #1 heater vent[d]	51.8	0.5	811	15.3
SRC15	Gasifier #2 heater vent[d]	51.8	0.5	811	15.3
SRC16	Gasifier flare	65	0.28	1273	20
SRC17	Selexol acid gas removal CO_2 vent	52	1.34	359	18
SRC18	Sulfuric acid vent (DELETED)	---	---	---	---
SRC19	Urea granulation vent	39.6	1.8	323	53.3
SRC20	Nitric acid unit tail gas vent	57.9	1.2	400	27.1
SRC21	Process flare	52	0.43	1273	20
SRC22	Cooling tower	13.23	25.51	303	8.33
SRC23	Urea melt plant vent	33.5	1.2	318	55.3
SRC24	Package boiler	33.5	1.8	422	10.3
SRC25	2 megawatt emergency generator	10.1	0.6	679	24.5
SRC26	500 kW diesel-fired emergency fire pump engine	4.6	0.3	779	24.9
SRC27	Ammonia storage flare	18.3	0.2	1273	20
SRC29	Ammonium nitrate neutralizer vent	16.5	0.3	344	91.4
SRC30	Zero liquid discharge system	7.6	2.3	317	27.1
SRC31	Steam superheater boiler	33.5	1.8	422	10.3

[a] Meters

[b] Kelvin

[c] Meters per second

[d] A single gasifier will operate at any one time. The other gasifier system will be on standby mode.

SIE/REH assumed a constant exit temperature for all stacks associated with feedstock handling emissions (SRC01 through SRC12). A constant temperature of 281 Kelvin (46.4 degrees Fahrenheit) is a conservative assumption for modeling during periods where the ambient temperature is greater than 46.4 degrees Fahrenheit. These emission points are exhaust vents for baghouses that control PM_{10} emissions from the storage, material transfer, and sizing operations of the coal and petroleum coke raw material.

3.4 Results for Ambient Impact Analyses

3.4.1 Significant Impact Analyses

This section describes dispersion modeling results for PM_{10}, NO_x, CO, and SO_2. Table 10 summarizes the results from SIE/REH's analyses submitted with the April 29, 2008 application. The results shown in this table represent a conservative (i.e., high) estimate of the predicted ambient impacts, as described in the paragraphs below. All modeled values are below SCLs; therefore, compliance with NAAQS, as required by Section 203.02 of the Rules, has been demonstrated. Determination of design concentrations for a full impact analysis by modeling facility-wide emissions of the proposed SIE/REH facility and the nearby co-contributing ConAgra/Lamb Weston facility is therefore not required.

The PM_{10} maximum modeled concentrations listed in Table 10 are from the originally-submitted analyses, with PM_{10} emissions from all point sources totaling 15.69 lb/hr. This is about **113%** of the 13.95 lb/hr allowed in the permit. The difference is due to the following:

- Feedstock PM_{10} emissions totaling 0.292 lb/hr, or 479% of the total 0.061 lb/hr allowed in the permit for these sources.
- Cooling tower PM_{10} emissions of 3.02 lb/hr, or 200% of the 1.51 lb/hr allowed in the permit for this source. In Addendum No. 1 to their application, SIE/REH submitted additional data based on revised exhaust parameters and a lower PM_{10} emission rate for the cooling tower. Only PM_{10} ambient impacts were affected by these changes. PM_{10} ambient impacts for the cooling tower were remodeled by SIE/REH using the reduced PM_{10} emission rate and increased exit velocity and equivalent stack diameter reflecting the correct data from the cooling tower vendor. SIE/REH verified that ambient PM_{10} impacts were less than the impacts from the original April 29, 2008 modeling analysis. Therefore, the use of the original ambient impacts is conservative for the SCL analysis.

The SO_2 maximum modeled concentrations listed in Table 10 are from the originally-submitted analyses, with SO_2 emissions from all point sources totaling 7.79 lb/hr. This is about **135%** of the 5.75 lb/hr allowed in the permit. The difference is due to the following:

- Emissions from the sulfuric acid plant vent of 2.23 lb/hr. SIE/REH deleted the sulfuric acid plant option in Addendum No. 3 to their application.
- SO_2 emissions from the acid gas removal CO_2 vent increased slightly from 3.57 lb/hr to 3.76 lb/hr due to increasing the thermal oxidizer efficiency from 90% to 95%.

The CO maximum modeled concentrations listed in Table 10 are from the originally-submitted analyses, with CO emissions from all point sources totaling 48.52 lb/hr. This is about **122%** of the 39.9 lb/hr allowed in the permit. The difference is due to the following:

- CO emissions from the acid gas removal CO_2 vent were modeled at 17.33 lb/hr. Increasing the thermal oxidizer efficiency from 90% to 95% results in decreasing CO emissions to 8.66 lb/hr.

Table 10. RESULTS OF SIGNIFICANT IMPACT ANALYSES

Pollutant	Averaging Period	Maximum Modeled Concentration[a] ($\mu g/m^3$)[b]	Significant Contribution Level ($\mu g/m^3$)	Facility-Wide Modeling Required?	Impact Percentage of Significant Contribution Level
PM_{10}[c]	24-hour	4.92	5.0	No	98%
	Annual	0.69	1.0	No	69%
SO_2[d]	Annual	0.21	1.0	No	21%
	24-hour	3.13	5.0	No	63%

Table 10. RESULTS OF SIGNIFICANT IMPACT ANALYSES					
Pollutant	**Averaging Period**	**Maximum Modeled Concentration[a] ($\mu g/m^3$)[b]**	**Significant Contribution Level ($\mu g/m^3$)**	**Facility-Wide Modeling Required?**	**Impact Percentage of Significant Contribution Level**
	3-hour	17.88	25.0	No	72%
NO_2[e]	Annual	0.91	1.0	No	91%
CO[f]	1-hour	308.63	2,000.0	No	15%
	8-hour	45.18	500.0	No	9%

a. Values are modeling results obtained by SIE/REH

b. Micrograms per cubic meter

c. Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

d. Sulfur dioxide

e. Nitrogen dioxide

f. Carbon monoxide

3.4.2 Toxic Air Pollutant Impact Analyses

Dispersion modeling for TAPs was required to demonstrate compliance with TAP increments specified by Idaho Air Rules Section 585 and 586. SIE/REH used the same method in analyzing TAP impacts as for the criteria air pollutants. All TAPs emissions from variable load sources (package boiler, steam superheater boiler, and the nitric acid plant) were modeled reflecting 100% load conditions.

The results of the TAPs analyses are listed in Table 11. The predicted ambient TAPs impacts were considerably below any TAPs increments.

Table 11. RESULTS OF TAPs ANALYSES				
Toxic Air Pollutant	**Averaging Period**	**Maximum Modeled Concentration ($\mu g/m^3$)[a]**	**AAC/AACC[b] (ug/m³)**	**Percent of AAC/AACC**
Noncarcinogenic TAPs				
Ammonia	24-hour	40.63[c]	900	4.5%
Carbonyl sulfide	24-hour	0.20	20	1.0%
Nitric acid	24-hour	0.69	250	0.3%
Nitrous oxide (N_2O)	24-hour	40[d]	4500	0.9%
Sulfuric acid (DELETED)	24-hour	---	---	---
Carcinogenic TAPs				
Arsenic	Annual	0.00	2.3E-04	0% (Negligible)
Benzene	Annual	9.0E-05	1.2E-01	0.08%
Cadmium	Annual	2.0E-05	5.6E-04	3.6%
Formaldehyde	Annual	1.3E-03	7.7E-02	1.7%
Nickel	Annual	4.0E-05	4.2E-03	1.0%
Polyaromatic hydrocarbons (PAHs)	Annual	1.0E-05	1.4E-02	0.07%

a. Micrograms per cubic meter

b Acceptable ambient concentration for non-carcinogens/acceptable ambient concentration for carcinogens

c Ammonia impact is from Addendum No. 1 to the application, for using a Claus elemental sulfur plant. The maximum impact submitted in the April 29, 2008 application (presumed use of a Haldor-Topsoe Wet Sulfuric Acid plant)was 40.09 $\mu g/m^3$, 24-hour average.

d See the Response to Comments document for this permit.

3.5 PSD Program Analyses

3.5.1 Class I Impact Analyses

Federal Land Managers (FLMs) have the responsibility of protecting air quality within designated Class I areas. FLMs accomplish this, with regard to proposed air quality permits, through evaluation of effects on visibility and pollutant deposition within the Class I areas using screening methods and refined dispersion modeling. If a refined dispersion modeling analysis is required by DEQ or FLMs, predicted impacts are compared against threshold values established by regulation and guidance materials.

Representatives from SIE/REH conducted a conference call on August 9, 2007 to discuss the Class I area modeling requirements with the FLMs including John Notar (National Park Service), Catherine Collins (Fish & Wildlife Service) and Thomas Dzomba (USDA Forest Service). Roger Turner from the Shoshone-Bannock Tribes and representatives from DEQ also participated in the call. During the call, the FLMs agreed that the National Park Service would take the lead in making decisions regarding the proposed PCAEC project.

SIE/REH conducted a Q/D (allowable emissions divided by distance between the facility and the Class I area) screening analysis according to established preliminary methods used by the FLMs to evaluate whether refined Class I impact analyses will be required for the proposed project. This analysis was presented to John Notar for evaluation and determination of whether the Q/D analysis was adequate for demonstrating that the project will not have adverse impacts on Class I areas. In the Q/D analysis, the level of potential annual emissions of NO_x, SO_2, and PM_{10}, in units of tons per year, are added to obtain the "Q" value. The nearest Class I area was determined to be the Craters of the Moon National Monument and Preserve (Craters). It is approximately 74 kilometers from the PCAEC site to the nearest boundary of Craters. Yellowstone National Park, Grand Teton National Park, and Hells Canyon National Recreation Area are each located at a greater distance from the project than Craters.

Documentation emailed by SIE/REH to John Notar, of the National Park Service, on April 25, 2008, included the following potential annual emissions, which included 50 startup scenarios and 8,760 hours per year of steady-state operation of the facility:

- PM_{10}: 69 tons/year,
- SO_2: 59 tons/year, and
- NO_x: 138 tons/year.

The Q value totals 266 tons/year, and the D value equals 74.4 kilometers. The Q/D value is therefore 3.58. This value is below the typical threshold value of 10 used by FLMs to indicate the need for refined Class I area impact analyses.

A May 6, 2008, email from John Notar, NPS, to Tom Hornyak, SIE/REH, indicated the FLMs would not request refined analyses consisting of formal Class I area increment consumption analyses and Class I area air quality related value (AQRV) analyses for this project. DEQ concurred with this approach in the November 8, 2007 modeling protocol approval letter from Kevin Schilling, Modeling Coordinator, DEQ, to Tom Hornyak, Manager, Environmental Permitting, Refined Energy Holdings.

3.5.2 Soils and Vegetation Impact Analyses

The project's effect on soils and vegetation is expected to be minimal because worst-case ambient impacts are below the significant contribution levels at all ambient air locations. Maximum impacts at most locations within the 100-kilometer by 100-kilometer receptor grid are substantially lower than the impact at the receptor exhibiting the maximum ambient impact. This further minimizes the project's potential to have adverse impacts on soils and vegetation.

3.5.3 Effect of Growth on Air Quality Projected for the Area

The PCAEC will be located approximately two miles southwest of American Falls. The area surrounding the site is predominantly agricultural, with the ConAgra/Lamb Weston facility located immediately north of the site. Since maximum pollutant impacts associated with the proposed SIE/REH facility were below significant contribution levels (SCLs), there is no definable area of "affect" for the facility. Consequently, for the area affected by the PCAEC, there have been no air quality impacts associated with general growth since 1977. Furthermore, the surrounding area has no experienced substantial growth. Census data provided by SIE/REH indicated a population of 6,844 for Power County in 1980 and a population of 7,538 in 2000. Any air quality impacts associated with such growth would be minimal.

SIE/REH provided a qualitative discussion of the effects that the new facility and the growth associated with its operation will have on the surrounding area's air quality. Approximately 150 people will staff the PCAEC after construction. The workforce is anticipated to be spread throughout the nearby area with several cities and towns (American Falls, Aberdeen, Pocatello, Chubbuck, Blackfoot, etc.) providing housing for the workforce. Commuting traffic will increase slightly as a result. Support services such as shops and gas stations are expected to be constructed. Semi and delivery truck traffic will increase for product delivery to the PCAEC site and businesses within the area. Coal and coke are the primary raw materials for the PCAEC site and these will be transported using the existing rail line serving the area. The rail line is the primary method for transporting products from the facility. None of these increases in rail or road travel were anticipated by SIE/REH to adversely affect air quality in the area.

3.5.4 Co-Contributing Sources

DEQ identified the ConAgra Foods (Lamb-Weston) facility as the only stationary source in the area of the proposed SIE site that could be considered a co-contributing source for air quality. Modeling of co-contributing sources was not required for this project because all maximum ambient impacts were predicted to be below the significant contribution levels.

3.5.5 Pre-Construction Monitoring of Existing Ambient Pollutant Levels

Maximum modeled impacts were below monitoring thresholds specified in Idaho Air Rules Section 202.c.viii; therefore, preconstruction air pollutant monitoring was not required by DEQ. Furthermore, since maximum modeled impacts are below significant contribution levels, any monitored values would not be used in the compliance demonstration.

3.5.6 Visibility Impairment Analysis

A refined Class I visibility and increment consumption analysis was not required for this project. The screening-level Q/D analysis, as described in Section 3.5.1 of this memorandum, was below thresholds used by FLMs to trigger a refined Class I visibility analysis.

To satisfy requirements of Section 202.c.v of the Rules, however, DEQ requested that SIE/REH perform a screening level visibility analysis to assess the visibility of the plume from Craters—the nearest Class I area. The results of the VISCREEN analysis are contained in Appendix I of the application. The VISCREEN analysis was conducted by Trinity Consultants on behalf of SIE/REH. The plume's color difference parameter (delta E) is used to evaluate how perceptible the plume's color differences are in relation to the surrounding terrain and skyline. The other parameter used in the VISCREEN analysis is the green contrast value which identifies the color contrast between the project's plume and the sky and the plume and the surrounding terrain.

Receptors of concern were located between the nearest and farthest Class I area boundaries of Craters of the Moon National Monument. These distances from the nearest boundary of the SIE/REH plant and the nearest and farthest Craters of the Moon boundaries were 74.7 kilometers and 85.7 kilometers, respectively. A distance of 110 kilometers was used as the background visual range for Craters of the Moon. Trinity selected worst-case meteorology and default particle size and density values for the analysis.

Model results are less than the delta E threshold value of 2, and the absolute value of the model result is less than 0.05. Based on this, a Level II VISCREEN analysis is not required. The results of SIE/REH's visibility analysis are summarized in Table 12.

Table 12. VISCREEN VISIBILITY ANALYSIS RESULTS

	Delta E	Green Contrast	Values less than thresholds? Delta E / Green Contrast
Sky (forward)	0.451	0.003	Yes / Yes
Sky (backward)	0.237	-0.005	Yes / Yes
Terrain (forward)	0.391	0.005	Yes / Yes
Terrain (backward)	0.068	0.002	Yes / Yes

All VISCREEN model outputs were below the Level I screening critical values. Additional refinement of the visibility analysis was not required for this project.

3.5.7 Increment Consumption Analyses

The modeling results for criteria pollutants indicated impacts for all pollutants and averaging periods were below significant contribution levels (SCLs). Therefore, the project cannot significantly contribute to a PSD Class II increment violation.

DEQ's modeling protocol approval letter also requested SIE/REH to perform a screening level analysis assessing consumption of Class I area increments, using modeled ambient impacts along the outer edge of the modeling domain. The edge of the 100-kilometer grid is approximately 50 kilometers away from the project site.

The FLM Significant Impact Levels (SILs) for Class I areas are more stringent than EPA SILs. For any impacts that exceeded the FLM or EPA SILs using the worst-case impacts from the Class II analysis, a more detailed AERMOD modeling analysis was conducted using receptors placed along the closest Class I area boundary for Craters. This identified the predicted increment consumption at the boundary of the Class I area. Tables 13 and 14 contain the increment consumption values for the PCAEC project.

Table 13. Increment Consumption Using Class II Analyses

Pollutant and Averaging Period	EPA Significant Impact Limit ($\mu g/m^3$)[a]	FLM Significant Impact Limit ($\mu g/m^3$)	Class II Modeling Impact ($\mu g/m^3$)	Year(s) of Maximum Concentration
NO_2[b], Annual average	0.1	0.03	0.02	2001-2005
PM_{10}[c], Annual average	0.2	0.08	0.009	2002, 2004, 2005
SO_2[d], Annual average	0.1	0.03	0.005	2001-2005

[a] Micrograms per cubic meter.

[b] Nitrogen dioxide

[c] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

[d] Sulfur dioxide

Table 14. Increment Consumption Using Refined Craters Boundary Receptors				
Pollutant and Averaging Period	**EPA Significant Impact Limit ($\mu g/m^3$)[a]**	**FLM Significant Impact Limit ($\mu g/m^3$)**	**Craters Boundary Impact ($\mu g/m^3$)**	**Year(s) of Maximum Concentration**
PM_{10}[b], 24-hour average	0.3	0.27	0.025	2002
SO_2[c], 3-hour average	1.0	0.48	0.05	2002
SO_2, 24-hour average	0.2	0.07	0.012	2002

[a] Micrograms per cubic meter.

[b] Particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers

[c] Sulfur dioxide

SIE/REH demonstrated that predicted maximum ambient impacts will not consume available increment levels at or above any EPA or FLM significant impact limit.

3.5.8 National Ambient Air Quality Standards Compliance

A full ambient impact NAAQS analysis was not required for this project. All maximum ambient impacts associated with the PCAEC project were predicted to be below the significant contribution levels.

4.0 Conclusions

The ambient air impact analysis submitted, in combination with DEQ's review and verification analyses, demonstrated to DEQ's satisfaction that emissions from the facility, as represented by the applicant in the permit application, will not cause or significantly contribute to a violation of any air quality standard.

Appendix D – EPA Applicability Determinations

Determination Detail

Control Number: 0000130

Category: NSPS
EPA Office: Region 5
Date: 10/08/1999
Title: Subpart Db - Coke Oven Gas & Furnace Oven Gas Applicability
Recipient: John Heintz
Author: George Czerniak
Comments:

Subparts: Part 60, Db Indust.-Comm.-Inst. Steam Gen. Units

References: 60.41b
60.42b

Abstract:

Q: Does coke oven gas constitute "coal" as defined under Subpart Db?

A: Yes. For the purposes of Subpart Db, coke is a coal-derived synthetic fuel, and hence is regulated as coal under Subpart Db.

Q: Does blast furnace gas constitute "coal" as defined under Subpart Db?

A: No. Blast furnace gas is not derived from coal, and hence, is not regulated as coal under Subpart Db.

Letter:

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
AIR AND RADIATION DIVISION
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

AE-17J

John K. Heintz
Director of Environmental Affairs
National Steel Corporation
4100 Edison Lakes Parkway
Mishawaka, Indiana 46545-3440

Dear Mr. Heintz:

This letter is in response to your letter of June 1, 1999 regarding the applicability of the New Source Performance Standards (NSPS), 40 C.F.R. Sec. 60.40b, et seq., (Subpart Db), to boilers fired with coke oven gas (COG) and blast furnace gas (BFG). Based on the information that you have submitted to us, and after studying the definitions under Subpart Db, the United States Environmental Protection Agency (U.S. EPA) reaffirms its earlier interpretation that coke oven gas (COG) constitutes coal as defined for Industrial-Commercial-Institutional Steam Generating Units (40 C.F.R. Part 60, Subpart Db). You also inquired about whether blast furnace gas (BFG) is coal. After conducting a similar analysis, we have concluded that BFG does not constitute coal, as defined at Sec. 60.41b.

Subpart Db applies to each steam generating unit, as defined in 40 C.F.R. Section 60.41b, that commences construction, modification, or reconstruction after June 19, 1984 and that has a heat input capacity of greater than 100 million Btu/hour. We have reviewed BIDs, Federal Register notices, and previous interpretations of Subparts D, Da, Db, and Dc. It is our conclusion that for purposes of Subpart Db, COG is a coal-derived synthetic fuel. According to the Subpart Db definition, at 40 CFR 60.41b, coal includes, among other things, "Coal-derived synthetic fuels, including but not limited to solvent refined coal, gasified coal, coal-oil mixtures, and coal-water mixtures..."

The definition of coal under 40 CFR Sec. 60.41b is broad. The words "including but not limited to" in Section 60.41b indicate that all coal-derived synthetic fuels are coal for purposes of Subpart Db, regardless of whether they are specifically listed. In promulgating Subpart Db, EPA explained that the rule was intended to have broad application: "Coal and all coal-derived fuels, including both liquid and gaseous fuels, are being covered because there are demonstrated control technologies available to reduce emissions from the combustion of fuels in both forms." 51 FR 42768-42773 (November 25, 1986).

COG is clearly a coal-derived gaseous fuel. COG is produced in coke ovens during the coking process where the volatile matter of coal is driven off, in the form of COG, by extremely high temperatures. The only thing left is coke (basically carbon), which is shipped off for use, primarily, in blast furnaces as a fuel and reducing agent. COG is also synthetic, that is, "man-made." COG used as fuel, therefore, is a coal-derived synthetic fuel and, hence, is regulated as coal under Subpart Db. COG is derived from a process that heats coal for the purpose of separating coal into solid (coke) and gaseous components that have valuable heat content.

In your June 1, 1999 letter, you quote a comment and response that appear in the final Background Information Document for the Subpart Dc rulemaking, EPA-45/3-90-016, at pp. 2-27 to 2-28. The commenter stated that it was not clear whether the definition of coal as proposed included COG. As you note, the proposed definition of coal for Subpart Dc was nearly identical to the Subpart Db definition. In our response to the commenter, we stated that the definition of coal in the regulation did not include COG. However, the definition of coal in the regulation is not the same as the definition of coal in the proposed rule. As you note, EPA revised the proposed Subpart Dc definition prior to promulgation by adding the phrase "derived from coal for the purpose of creating useful heat." This phrase does not appear in the Subpart Db definition of coal. Nevertheless, you conclude that EPA cannot interpret the Subpart Db and Subpart Dc definitions differently. We disagree with this conclusion. The definition of coal in Subpart Db is more general and hence has broader reach. We also believe there are sound policy reasons for interpreting the Subpart Db definition more broadly. Subpart Db was intended to cover a variety of fuels, the combustion of which would have environmental impact if combusted. Subpart Dc, however, is more limited because it covers smaller units. It is a common and desirable practice for EPA to incorporate fewer requirements into its regulations for smaller process equipment.

For Subpart Db purposes, it does not matter whether COG is "derived for the purpose of creating useful heat." Once it is burned in a boiler, it is a fuel, regardless of whether it was derived for that specific purpose. It is, in fact, used as a fuel. Moreover, COG, as a coal-derived synthetic fuel, is a fuel for which demonstrated technology exists for the control of sulfur dioxide emissions.

You attached to your letter two Subpart D applicability determinations stating that COG is not a fossil fuel as defined in Subpart D because it is not "derived for the purpose of creating useful heat." Again, this phrase does not appear in Subpart Db. Therefore, we need not reach the same decision here as we did in the Subpart D applicability determinations.

As for BFG, we reach a different conclusion. While COG is clearly derived from coal, BFG is derived from reducing iron ore. In a blast furnace, carbon (from coke) reacts to form carbon dioxide and heat. In the presence of carbon and heat, the carbon dioxide is reduced to carbon monoxide. The limestone that is added to the blast furnace causes a reaction of calcium carbonate to form calcium oxide and carbon dioxide. The calcium oxide is used to remove sulfur impurities from the iron ore, thus forming calcium sulfide and carbon monoxide. Unlike COG, BFG consists largely of carbon monoxide as a byproduct of a reaction that removes sulfur from the iron. So, unlike the production of coke, and associated COG, which is derived directly from coal, the blast furnace causes a complex reaction between coke and iron ore, in the presence of oxygen, to form an iron product. The BFG is not derived from coal. U.S. EPA, therefore, concludes that BFG is not coal as defined at 40 CFR 60.41b, so that the combustion of BFG as a boiler fuel is not subject to the standard for sulfur dioxide at 40 C.F.R. Sec. 60.42b.

U.S. EPA's Region 5 has coordinated this response to your request with U.S. EPA's Office of Air Quality Planning and Standards, Office of General Counsel, and the Office of Enforcement and Compliance Assurance. This interpretation of the definition of "coal" in Subpart Db is not a binding adjudication of liability for any source and does not constitute final agency action. We are willing to assist you with the understanding of the requirements of Subpart Db, including emission limits, testing, monitoring, record-keeping, and reporting, as necessary. If you have any questions regarding this matter, please feel free to contact Jeffrey L. Gahris, of my staff, at (312) 886-6794.

Sincerely yours,

George T. Czerniak, Jr., Chief
Air Enforcement and Compliance Assurance Branch

cc: Dennis Drake, Chief
Air Quality Division
Michigan Department of Environmental Quality

Wendy Barrott, Director
Air Quality Management Division
Wayne County Department of the Environment

Appendix E – Facility Draft Comments

SIE General Comment #1– Process descriptions may be better placed in the Statement of Basis rather than this permit. If a summary level process description is needed for this permit, please add a clarifier that says "Process descriptions contained within this permit are provided for informational purposes only, and are not considered Permit Limits and are Not Enforceable Limits or Conditions."

> Comment incorporated. A statement has been added at the beginning of each of the process descriptions noting that these are for information only.

SIE General Comment #2 – Given that this is a complex facility that is subject to numerous NSPSs, we propose that the Permit only provide a list of applicable NSPSs. Our concern is that if the permit contains a description of an NSPS, and the NSPS changes, we will be subject to multiple interpretations of a NSPS.

> Comment not incorporated. DEQ air quality permits typically include specific applicable NSPS limits and requirements. When NSPS requirements are modified, the requirements are more stringent (to avoid "backsliding"), so compliance with the specific limit in the permit is assured by meeting the new NSPS requirement(s). In addition, changes to NSPS requirements often do not apply to existing facilities unless and until that "affected facility" is modified. Specifying the NSPS requirements in the permit also avoids being subject to different interpretations during compliance inspections.

SIE General Comment #3 – Descriptive tables, like table 3.1, should be moved to the Statement of Basis. The tables may be viewed as permit limits or constraints, which is not the intended purpose of the tables.

> Comment incorporated in part. A statement has been added at the beginning of each of the process descriptions noting that the information in the table(s) are for information only. [Note: these statements were deleted in the final permit.] However, the information presented in the table is supposed to be representative of the as-constructed facility parameters and operations. Significant differences between the as-constructed facility or operational parameters from the information in this table may be a violation of the permit. If the final design differs significantly from the information presented in the application, it is the applicant's responsibility to request a modification to the permit, and to demonstrate that the revised design will meet air quality requirements. (see #8, Permit Authority, on the permit cover page). This clarification has been added for the each of the process description and table conditions discussion in the statement of basis (see Section 4.11, Permit Conditions Review).

SIE General Comment #4 – As a PSD Major Source, we are seeking a permit that is based on compliance with emission limits and not operational limits. Throughout this draft, we have attempted to remove operational constraints unless they are necessary to demonstrate compliance with permit limits/conditions].

> Comment incorporated in part. Emission limits are tied to operational parameters, including for example, feed rates and production rates. Conditions were included to allow the facility to operate at the feed rates and/or production rates used in any performance test conducted within the previous 5-year period that demonstrated compliance with the applicable emission limit(s). Where supported by the modeling analysis, operational limits and monitoring were deleted from the draft permit. The statement of basis includes a discussion why operational limits were or were not imposed (see Section 4.11, Permit Conditions Review).

SIE Specific Comment #5 – Terms need to be defined: startup, initial startup, commence operations.

> Comment incorporated. These definitions have been included in Permit Condition 2.1, in addition to the definition for malfunction.

SIE Specific Comment #6 – Requirement for a fugitive dust control plan is excessive, given the level of control to be used at this facility.

Comment incorporated. With or without a formal fugitive dust control plan, the facility must take all reasonable precautions to prevent causing fugitive dust, in accordance with IDAPA 58.01.01.650-651. Permit Condition 2.5 was changed to provide more detail regarding reasonable precautions, particularly during construction activities. See the discussion for this permit condition in Section 4.11, Permit Conditions Review, in the statement of basis.

SIE Specific Comment #7 – Reduce frequency of visible emissions inspections from weekly to monthly after 3 months of operation, and to quarterly after 6 months of operation if weekly and monthly visible emissions inspections show no visible emissions.

Comment incorporated in part. The inspection frequency for visible emissions from point sources was reduced from weekly to monthly, and a provision added that visible emission inspections are not required for any baghouse stack if the baghouse is equipped with a bag leak detection system that provides continuous monitoring for baghouse performance.

SIE Specific Comment #8 – Increase the maximum use of PSA tailgas that might be burned in the boilers from 40% to 100%.

Comment incorporated.