ACTION: [XX] Initial Approval
[ ] Final Approval
[XX] Modification XX IA / FA
[ ] Permit Exempt-APEN Required
[ ] HAPs [ ] Criteria
[ ] < 2/1/72 [ ] Specific
[] Exempt-No APEN
[] Increase in throughput
[ ] Transfer of Ownership
[ ]

AIR POLLUTION CONTROL DIVISION
COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT

SUMMARY OF PRELIMINARY ANALYSIS

APPLICANT PLANT LOCATION	Denver Zoological foundation Waste Management Building 2300 23rd St Denver, CO	Permit No	12DE2647
		AIRS ID	031/0149/010-013
REVIEW ENGINEER	Michael J. Harris, P.E.	Date	October 2014
CONTROL ENGINEER	R K HANCOCK III, P.E.	PAGEs	7

Project Description

The Zoo is proposing to build and operate a " waste to energy system" The following description is from the cover letter sent with the application. "The facility will accept animal waste, office waste and concession stand wastes generated at the zoo along with cardboard and other pre-screened dry materials from outside resources. The wastes will be shredded, dried, pelletized into a fuel pellet. The fuel will be introduced to the waste to energy system, which uses gasification as the technology to thermally convert zoo fuel pellets into a synthetic gas that will be mixed with an amount of natural gas to run a small engine to generate electricity to power the zoo's operations."

A modification to the original zoo plan adds a "micro turbine" as another source of electrical generation. The micro turbine runs in parallel with the natural gas engine. Calculated emissions from the micro turbine (based on AP-42 table 3.1) are very low, an APEN is required for the micro turbine since NOx emissions exceed 1 ton per year. In addition, *a permit is also required since the total facility emissions for all emission points requiring an APEN are above permitting levels for NOx (and also VOC and CO.)*

There are four major sections to the waste to energy process. They are 1) drying, 2) pellet cooler, 3) synthesis gas generator, - thermal oxidizer control (TOC) and scrubber, and 4) synthesis gas generator and scrubber / gas fired engine / (or micro turbine) /generator. The process will be built in stages with the drying and pellet cooler being completed first to allow fuel pellets to be produced. The gasifer with the TOC and scrubber for emission control will be completed next. The Zoo intends to operate the gasifier/TOC for a period of time (3-6 months) to generate synthesis gas for characterization and to optimize the performance of the gasifier. The final step will be to bring the engine/generator on line to begin producing electricity and heat for the Zoo. The Zoo hopes to produce up to 20% of the required electricity and heat needed for Zoo operations.

During normal operations the gasifier will require some flaring of syngas as part of the startup of the system. The Zoo anticipates no more than an estimated 20 hours per week of flaring the raw syngas once the entire process has been constructed and is in full operation. Once the gasifier has reached operating temperature the syngas will be cleaned and combined with natural gas to power the engine/generator. Emissions from the engine will be controlled with non-selective catalytic reduction to control emissions of NOx, CO and VOC.

During the initial phase of the project the Zoo anticipates that the TOC could be required to operate for up to 4000 hours as the Zoo collects information on the performance of the gasification system to be used to design and fine tune the gas clean up process.

The Zoo initially submitted their emission limits based on the process development and computer modeling that they had

commissioned. These limits were supplanted by the short term emission limits that are derived from the requirements in NSPS subpart EEEE – table 1 which has limitations on the following compounds: cadmium, carbon monoxide, dioxins/furans, hydrogen chloride, lead, mercury, opacity, oxides of nitrogen, particulate matter and sulfur dioxide. These process limits were then used to determine what the annual process emission limits would be in the permit.

As a consequence, the zoo had to modify their process design to meet of the more stringent requirements in Subpart EEEE. The basic process consists of the following steps.
Start up of gasifier - Substandard syn gas is sent to the TOC for combustion and the TOC combustion products are sent to a scrubber to remove acid gas constituents and other compounds(?) (Note that here the syn gas is combusted prior to scrubbing. This is because the gasifier has not yet reached operating temperature and the syn gas being produced contains components that if cooled in a scrubbing step, will condense and form tars and other sticky products that will gum up the scrubber and process equipment downstream of the scrubber.)

Once the gasifier reaches operating temperature and is making quality syn gas, the syn gas is then passed through a scrubber to remove the acid gas component and the scrubbed syn gas is combusted in the engine/generator or micro turbine to generate electricity. The engine exhaust is further controlled with NSCR to reduce NOx, CO and VOC emissions

A major question for the proposed process was the status of the waste materials being used in the process – are the materials municipal waste or do they constitute a fuel? The question was submitted to EPA region 8 and through them to EPA HQ. The EPA decision is that all of the materials are considered to be municipal waste (phone conversation with Region 8 – Sherrie Kinard 2.20.14). The result of this decision is that the TOC/scrubber are considered to be an incinerator and subject to NSPS subpart EEEE – Other Solid Waste Incinerators (OSWI). The requirements of OSWI are substantial and are included in the permit.

Per discussions with EPA Region 8 (Sherrie KInard [phone call from Kinard to Harris FEBRUARY XX< 2014 and confirmed in a phone call to Jennifer Hale (Denver Zoo) on September 23, 2014.]) OSWI applies only to the incinerator (thermal oxidation control) and not to the engine or the micro turbine. The engine is subject to NSPS Subpart JJJJ. Turbines are subject to NSPS Subpart GG, however the mircroturbine is exempt from the NSPS because the design heat input is below the threshold *design is 0.8 mm BTU/hour and the threshold is10 mm BTU/hour. See 40CFR §60.330(a).

Note that this permit is for a synthetic minor source. *However, OSWI requires that the source must also apply for a Title V permit (NSPS Subpart EEEE* §60.2966 - .2967)

EMISSION FACTOR SOURCE:

Zoo estimates based on testing of a small pilot unit, manufacturer's guidance, and
NSPS Subpart EEEE (OSWI) Table 1 for the synthesis gas generator controlled by the TOC and scrubber
NSPS Subpart JJJJ for the natural gas engine
AP 42 table 3.1 for the micro turbine.

SOURCES OF EMISSIONS:

Mechanical drier – particulate matter
Pellet Cooler – particulate matter
Gasifier, TOC and scrubber – Cd, CO, Dioxin and furans, HCl, Pb Hg, Opacity, NOx, PM, and SO2. (See NSPS Subpart EEEE)
Engine – particulate matter, NOx, SO2, VOC and CO (See NSPS subpart JJJJ)_
Microturbine - particulate matter, NOx, SO2, VOC and CO

THROUGHPUTS:
Zoo waste – shredded and dried – 1,916 tons
Zoo fuel pellets – 1,610 tons
Thermal Oxidizer Control (TOC) – 65.94 million scf syn gas @ 120 btu/scf and 7.1 million scf natural gas @ 1020 btu/scf
Engine - 156.3 million scf syn gas @ 120 btu/scf and 18.74 million scf natural gas @ 1020 btu/scf
Micro turbine - syn gas 30.7 million scf syn gas @ 120 btu/scf and 3.3 million scf natural gas @ 1020 btu/scf

SUMMARY OF EMISSIONS (TONS PER YEAR): PUBLIC NOTICE REQD. ? [ ] YES [ ] NO

	TSP	PM_{10}	$PM_{2.5}$	NOx	VOC	CO	SO_2	HAPs
EXISTING FACILITY, PTE	1.13	1.13	1.13	10.21	0.7	8.45	0.43	0
FACILITY TOTAL AFTER CHANGE	7.42	7.42	7.42	24.8	10.0	40.4	0.65	2,311
CONTROLLED ACTUAL, STACK								
UNCONTROLLED ACTUAL, STACK								
POTENTIAL MAXIMUM								
FUGITIVE, ACTUAL								
Net Change (this project)	6.3	6.3	6.3	14.6	9.3	32.0	0.22	2,311
SPECIFIC EMISSION STANDARD								

HAZARDOUS POLLUTANTS (NOTE MAIN TYPES AND QUANTITIES WHICH REQUIRE REPORTING):

Hydrogen chloride	1,111	LB/YR	Formaldehyde	800	LB/YR
		LB/YR			LB/YR

Note: due to recent changes to Regulation 3, HAPS are reportable if the uncontrolled emission exceeds 250 pounds per year. Bins and scenarios have been eliminated.

PROPOSED CONTROLS & EFFICIENCY:

The fuel pellet preparation process includes a dryer and a pellet cooler which are both controlled with cyclones and dust control systems – estimated control efficiency is 90%

The synthesis gas generator is considered to be an emission source with emissions controlled by the combination of the TOC and scrubber. Emission limitations are listed in NSPS, subpart EEEE (OSWI) table 1. The zoo emissions will be required to meet the OSWI mandated limitations as listed, whatever the efficiency of the TOC scrubber control is.

The engine is equipped with non selective catalytic reduction (NSCR) which is estimated to control CO and NOx with 90% control efficiency and VOC with 50% control efficiency. The engine is subject to NSPS subpart JJJJ and the emission standards of Subpart JJJJ

DISCUSSION

Emissions:

		UNCONTROLLED EMISSIONS - TPY						CONTROLLED EMISSIONS - TPY				
Equipment	AIRS ID	NOx	CO	VOC	PM	SO2		NOx	CO	VOC	PM	SO2
Dryer	010	------	------	2.41	53.05	-----		------	------	2.41	5.3	-----
Pellet Cooler	011	-----	-----	-----	5.3	-----		------	-----	------	0.53	-----
Synthesis gas generator, TOC and scrubber	012	(1)						0.8	0.188	3.0	0.24	0.06
Engine	013	126	315	12.6	0.2	13		12.6	31.5	6.3	0.13	0.14

Microturbine		1.2	0.29	0.01	0.02	0.03		1.2	0.29	0.01	0.02	0.03
TOTAL		127.2	315.29	15.02	58.57	13.03		14.6	31.98	11.72	6.22	0.23

1. Emissions for the syn gas generator, TOC and scrubber are based on emission limitations from NSPS subpart EEEE table 1.

Based on the **Potential to Emit (PTE)** emissions of CO and NOx this is a **synthetic minor source for PSD, NANSR.**

source	HAP	Emission Factor	Emission factor source	Uncontrolled (lb/yr)	Controlled (lb/yr)
Engine	Hydrogen chloride	0.09 lb/hr	Eng estimate	747	747
Engine	Formaldehyde	2.06E-02 lb/MMBTU	AP-42	1,600	800
Engine	Acetaldehyde	2.8E-03 lb/MMBTU	AP-42	200	100
Engine	Acrolein	1.58E-03 lb/MMBTU	AP-42	200	100
Engine	Benzene	1.6E-03 lb/MMBTU	AP-42	200	200
TOC	Hydrogen chloride	4.25 lb/hr	Eng estimate	17,000	364

Gasifier / TOC / scrubber emissions:
Since the TOC is considered to be an incinerator it is subject to NSPS Subpart EEEE, (OSWI) and OSWI has several short term emission limits contained in Table 1. These emission limits are used to determine the emissions from the TOC / scrubber as shown below:

TOC (PTE – 8784 hours per year)
CO = (40 ppm) = (40/ppm) / (359 ft3/lb-mole) * (28 lb/lb mole) * (64000 scf/hr) * 8784 hrs/yr = 0. 0.8769 tpy
HCl = (15 ppm) = (15/ppm) / (359 ft3/lb-mole) * (36.5 lb/lbmole) * (64000 scf/hr) * 8784 hrs/yr = 0.4287 tpy
NOx = (102 ppm) = (102/ppm) / (359 ft3/lb-mole) * (46 lb/lb mole) * (64000 scf/hr) * 8784 hrs/yr = 3.67 tpy
SO2 = (3.1 ppm) = (3.1/ppm) / (359 ft3/lb-mole) * (64 lb/lb mole) * (64000 scf/hr) * 8784 hrs/yr = 0.1553 tpy

TOC (330 hours per month)
CO = (40 ppm) = (40/ppm) / (359 ft3/lb-mole) * (28 lb/lb mole) * (64000 scf/hr) * 330 hrs/month = 0.0329 tpm * 12 = 0.3953 tpy
HCl = (15 ppm) = (15/ppm) / (359 ft3/lb-mole) * (36.5 lb/lbmole) * (64000 scf/hr) * 330 hrs/month = 0.0161 tpm *12 = 0.1933 tpy
NOx = (102 ppm) = (102/ppm) / (359 ft3/lb-mole) * (46 lb/lb mole) * (64000 scf/hr) * 330 hrs/month = 0.1380 tpm * 12 = 1.66 tpy
SO2 = (3.1 ppm) = (3.1/ppm) / (359 ft3/lb-mole) * (64 lb/lb mole) * (64000 scf/hr) * 330 hrs/month = 0.0058 tpm * 12 = 0.070 tpy

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Gasifier / scrubber / Engine (PTE)
The engine is subject to NSPS Quad J emission standards.
CO = (40/ppm) / (359 ft3/lb-mole) * (28 lb/lb mole) * (50581 scf/hour) * 735 hrs/month = 0.0580 tpm * 12 = 0.6960 tpy
HCl = (15/ppm) / (359 ft3/lb-mole) * (36.5 lb/lb mole) * (50581 scf/hour) * 735 hrs/month = 0.0283 tpm * 12 = 0.3400 tpy
NOx = (102/ppm) / (359 ft3/lb-mole) * (46 lb/lb mole) * (50581 scf/hour) * 735 hrs/month = 0.2430 tpm * 12 = 2.92 tpy
SO2 = (3.1/ppm) / (359 ft3/lb-mole) * (64 lb/lb mole) * (50581 scf/hour) * 735 hrs/month = 0.0103 tpm * 12 = 0.123 tpy

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Microturbine (PTE)
Based on emission factors from AP 42 Table 3.1 and
Syngas throughput of 30.7 mm scf @ 120 btu/scf = 3,684 MM BTU
Natural gas throughput of 3.3 mm scf @ 1,020 btu/scf = 3,366 MM BTU
Total BTU = 7,050 MM BTU
NOx = 7,050 MM BTU * 0.32 lb/MM BTU = 1.128 tons
CO = 7,050 MM BTU * 0.082 lb/MM BTU = 0.2891 tons
TSP = 7,050 MM BTU * 0.0047 lb/MM BTU = 0.01662 tons
VOC = 7,050 MM BTU * 0.002 lb/MM BTU = 0.0071 tons

Emission limitations:
Dryer AIRS Point 010
PM10/PM2.5 controlled emission factor = 0.00126 lb/lb (filter = 90% control)
Throughput = 768 pounds per hour
Controlled PM10/PM2.5 = 768 * 0.00126 * 8760 * (ton/2000) = 4.24 tpy
With 25% safety factor = 4.24 * 1.25 = 5.3 tpy
Uncontrolled (back calculated) = 5.30 tpy /(1-.9) = 53 tpy

Pellet Cooler AIRS Point 011
PM10/PM2.5 controlled emission factor = 0.08 lb/ton (filter = 90% control)
Throughput = 1.2 tons per hour
Controlled PM10/PM2.5 = 1.2 tpy* 0.08 * 8760 * (ton/2000) = 0.42 tpy
With 25% safety factor = 0.42 * 1.25 = 0.53 tpy
Uncontrolled (back calculated) = 0.53 tpy /(1-.9) = 5.3 tpy

Syn gas generator TOC and scrubber – AIRS point 012
Emission factors are taken from NSPS Subpart EEEE (OSWI) Table 1
Air flow = 64,000 scf/hour 1 Year = 8784 hours (leap year)

	Cd	CO	D/F	HCl	Pb	Hg	NOx	PM	SOx
Emissions tpy	3.14e-4	8.77e-1	5.97e-7	4.28e-1	3.97e-3	1.30e-3	3.72	5.22e-1	1.55e-1
Emission factor	18mg/m3	40 ppmv	33 ng/m3	15 ppm	226 ug/m3	74 ug/m3	103 ppm	0.013 g/scf	3.1 ppm

Example Calculations

Pb = (226 ug/m3) * (64,000 scf/hr) * (m3/35.31 scf) * (g/10^6 ug) * (lb/453.6 g) * (ton/2000 lb) *(8784hr/yr) = 3.966 e -3 tpy

NOx = 103 ppm * (64,000/hr) * (lb-mole/359 scf) * (46 lb/lb mole) * (8784 hr/yr) *(ton/2000 lb) = 3.72 tpy

PM = 0.013 gr/scf * (64,000 scf/hr) * (8784 hr/yr) * (lb/7000 gr) * (ton/2000 lb) = 0.5220 tpy

Equipment Description

Mechanical Dryer – manufactured by First American Scientific Corporation (FASC), model KDS-3. The mechanical dryer works as follows (taken from their website www.fasc.net/fasc-brochure. "material enters the torus rotor chamber where it falls onto spinning chains and is subject to enormous centrifugal accelerations. The chains spin with a tip speed of about 400 mph. The material is fractured as it impacts repetitively with the chains and the strike plates on the sides of the torus. Moisture is squeezed out of the material due to the compressive action of the impacts. Heat created from the kinetic energy of the impacts also evaporates some of the moisture in the material. When appropriate particle size reduction is achieved, air flow in the torus lifts the particles upwards towards the classifier."
Since the dryer is electrically powered, it does not combust any fuel as part of the drying process. The emissions are primarily particulate matter.

Fuel pellets are formed using a California Pellet mill (model = Century) twin screw extruder. The formed pellets are cooled in a vertical pellet cooling system (Colorado Mill Equipment, model CF3). Cooling air is drawn through the cooling unit. Particulate control is achieve with a cyclone.

TOC– manufacturer and model TBD

Engine – The NGE 21.9L is EPA certified Natural Gas and Propane engine.

Micro turbine – Capstone C60micro turbine, rated at 804,000 btu/hr (7,050 MM Btu per year) APEN required, permit exempt

SCC Codes

Dryer - 30200102 (tons produced) This is for alfalfa production

Pellet Cooler – 30200104 (units are in tons produced) This is for alfalfa pellet production.

TOC - 30390024 – process gas (units in million cubic feet burned)

Co-gen engine – 20100702 – process gas (units in million cubic feet burned)

Micro turbine – 20200701 - process gas (units in million cubic feet burned)

Regulatory

NSPS subpart EEEE (OSWI) §60.2880 - §60.2977 – applies based on EPA HQ/region 8 analysis (phone call with Region 8 Sherrie Kinard 2.20.14). EPA headquarters determined that all of the waste materials that the ZOO plans to use in their fuel making process are considered to be municipal solid waste. This ruling eliminated the possibility of the Zoo avoiding the requirements of subpart EEEE by claiming an exclusion for using a fuel mix that is less than 30% MSW (See §60.2887(b)(1)). The subpart EEEE has nine major requirements as outlined below plus a requirement for a Title V permit

1. §60.2894 - .2895 Preconstruction siting analysis
   §60.2894 – Who must prepare a siting analysis
   §60.2895 – What is a siting analysis

2. §60.2899 - .2901 Waste management plan
   §60.2899 – What is a waste management plan
   §60.2900 – When must I submit my waste management plan
   §60.2901 - What should I include in my waste management plan

3. §60.2905- .2911 Operator training and qualification
   §60.2905 – What are the operator training and qualification requirements
   §60.2906 - When must the operator training course be completed
   §60.2907 - How do I obtain my operator qualification
   §60.2908 – How do I maintain my operator qualification
   §60.2909 How do I renew my lapsed operator qualification
   §60.2910 - What site specific documentation is required
   §60.2911 – What if all the qualified operators are temporarily not accessible

4. §60.2915 - .2918 Emission limitations and operating limits
   §60.2915 What emission limitations must I meet and by when
   §60.2916 – What operating limits must I meet and by when
   §60.2917 – What if I do not use a wet scrubber to comply with the emission limitations
   §60.2918 – What happens during periods of startup, shutdown and malfuntion

5. §60.2922 - .2923 Performance testing
   §60.2922 – How do I conduct the initial and annual performance test
   §60.2923 – How are the performance data used

6. §60.2927 - .2928 Initial compliance requirements
   §60.2927 – How do I demonstrate initial compliance with the emission limitations and establish the operating limits
   §60.2928 – By what date must I conduct the initial performance test

7. §60.2932 - 29.35 Continuous compliance requirements
   §60.2932- How do I demonstrate continuous compliance with the emission limitation and the operating limits
   §60.2933 – By what date must I conduct the annual performance test
   §60.2934 – May I conduct performance testing less often
   §60.2935 – May I conduct a repeat performance test to establish new operating limits

8. §60.2939 - .2945 Monitoring
   §60.2939 – What continuous emission monitoring systems must I install
   §60.2940 – How do I make sure my continuous emission monitoring systems are operating correctly
   §60.2941 – What is my schedule for evaluating continuous emission monitoring systems
   §60.2942 – What is the minimum amount of monitoring data I must collect with my continuous emission monitoring systems, and is the data collection requirement enforceable
   §60.2943 – How do I convert my 1-hour arithmetic averages into the appropriate averaging times and units
   §60.2944 – What operating parameter monitoring equipment must I install, and what operating parameters must I monitor
   §60.2945 – Is there a minimum amount of operating parameter monitoring data I must obtain

9. §60.2949 - .2962 Recordkeeping and Reporting
   §60.2949 – What records must I keep

§60.2950 – Where and in what format must I keep my records
§60.2951 – What reports must I submit
§60.2952 – What must I obtain prior to commencing construction
§60.2953 – What information must I submit prior to initial startup
§60.2954 – What information must I submit following my initial performance test
§60.2955 – When must I submit my annual report
§60.2956 – What information must I include in my annual report
§60.2957 – What else must I report if I have a deviation from the operating limits or the emission limitations
§60.2958 – What must I include in the deviation report
§60.2959 – What else must I report if I have a deviation from the requirement to have a qualified operator accessible
§60.2960 – Are there any other notifications or reports that I must submit
§60.2961 – Can reporting dates be changed

10. §60.2966 -.2967 Title V operating permits
§60.2966 – Am I required to apply for and obtain a title V operating permit for my unit
§60.2967 – When must I submit a title V permit application for my new unit

Title V operating permit – is required by NSPS Subpart EEEE §60.2966 -.2967 Title V operating permits, even thought the permit is for a synthetic minor source.

Note – Required prior to commencing construction §60.2952

- Statement of intent to construct
- Anticipated date of commencement of construction
- All documentation produced as a result of the siting requirements of §60.2895
- The waste management plan as specified in §§ 60.2899 through 60.2901
- Anticipated date of initial startup

Information Required prior to initial startup §60.2953

- Type(s) of waste to be burned
- Maximum design waste burning capacity
- Anticipated maximum charge rate
- IF APPLICABLE – the petition for site-specific operating limits under §60.2917
- Anticipated date of initial startup

The engine is subject to MACT ZZZZ and through MACT ZZZZ is also subject to NSPS JJJJ. The State has not yet adopted JJJJ and so it is left to EPA for regulation and enforcement. The permit contains a note telling the owner/operator to report as required to EPA and to send a copy of all materials to the state.

Unusual permit conditions: - Emission limits for the TOC (condition 8) are based on the emission limitations as listed in table 1 of NSPS Subpart EEEE §60.2880 and following.

RACT REQUIREMENTS

The Zoo is located in an ozone non attainment area anad is therefore required to apply Reasonably Available Control Technology (RACT) to all VOC and NOx emissions. The following were determined to by RACT for this facility:

RACT – VOC – NSCR for the engine

RACT – NOx NSCR for the engine and following the emission limits for the TOC from Table 1 of OSWI

RACT – VOC – the Thermal Oxidizer (TOC), engine and micro turbine were determined to be RACT for the synthesis gas generator.

Application completeness date: September 29, 2014 - received corrected non criteria reportable form for HCl emissions

INVENTORY SUMMARY

COUNTY / PLANT: 031/0149 PERMIT # 12DE2657 DATE: September 2014 EMISSIONS FOR DATA YEAR:2014

NSPS subpart(s) EEEE (JJJJ) MACT subpart(s) None Synthetic Minor source

Point #	Process	SCC Code	Process description (as on permit)	Pollutant or CAS #	Emission Factor (SCC units)	Ctrl Type	Ctrl %	Throughput (specify units)	Inventory Emissions	Fug Report? Y/N
010		30500360	Dryer	PM10/PM2.5	55.43 lb/ ton processed	Cyclone/dust control	90	1,916 tpy	5.3 tpy	N
				VOC	2.52 lb / ton processed	NA	0	1,916 tpy	2.4 tpy	
011		30200806	Pellet Cooler	PM	6.58 lb / ton processed	Cyclone/dust control	90	1,610 tpy	0.53 tpy	
012		50100411	Syntheseis gas generator, Thermal oxidizer control (TOC) and scrubber	Cd	8.73 e-3 lb / mm scf	NA	0	72.04 mm scf	3.14 e-4 tpy	N
				CO	24.43 lb/mm scf	NA	0	72.04 mm scf	0.88 tpy	N
				Dioxin/furan	1.6e-5 lb/mm scf	NA	0	72.04 mm scf	5.79 e-7 tpy	N
				HCl	11.88 lb/ mm scf	NA	0	72.04 mm scf	0.43 tpy	N
				Pb	0.11 lb/ mm scf	NA	0	72.04 mm scf	3.79e-3 tpy	N
				Hg	0.036 lb/ mm scf	NA	0	72.04 mm scf	1.30 e -3 tpy	N
				NOx	105 lb/mm scf	NA	0	72.04 mm scf	3.79 tpy	N
				PM	14.43 lb/ mm scf	NA	0	72.04 mm scf	14.43 tpy	N
				SO2	4.44 lb / mm scf	NA	0	72.04 mm scf	0.16 tpy	N
				VOC	83.28 lb/ mm scf	NA	0	72.04 mm scf	3.0 tpy	N

INVENTORY SUMMARY

COUNTY / PLANT: 031/0149 PERMIT # 12DE2657 DATE: September 2014 EMISSIONS FOR DATA YEAR:2014

NSPS subpart(s) EEEE (JJJJ)` MACT subpart(s) None Synthetic Minor source

Point #	Process	SCC Code	Process description (as on permit)	Pollutant or CAS #	Emission Factor (SCC units)	Ctrl Type	Ctrl %	Throughput (specify units)	Inventory Emissions	Fug Report? Y/N
013		50100421	Waste gas recovery (internal combustion engine)	PM	2.28 lb / mm scf	NA	0	175.06 mm scf (combined nat gas and syn gas)	0.2 tpy	N
				NOx	616.9 lb/mm scf	NSCR	90	175.06 mm scf (combined nat gas and syn gas)	5.4 tpy	N
				SO2	1.60 lb/mm scf	NA	0	175.06 mm scf (combined nat gas and syn gas)	0.14 tpy	N
				VOC	85.68 lb/mm scf	NSCR	50	175.06 mm scf (combined nat gas and syn gas)	3.75 tpy	N
				CO	1222 lb/ mm scf	NSCR	90	175.06 mm scf (combined nat gas and syn gas)	10.7 tpy	N
014		20300701	microturbine	NOx	0.32 lb/ MM BTU	NA		7,050 MM BTU	1.13	
				CO	0.082 lb / MM BTU	NA		7,050 MM BTU	0.29	
				TSP	0.0047 lb / MM BTU	NA		7,050 MM BTU	0.02	
				VOC	0.002 lb / MM BTU	NA		7,050 MM BTU	0.01	
				HCl					1,111 lb/year	
				Formaldehyde					800 lb/ year	