TECHNICAL SUPPORT DOCUMENT

APPLIED PLANT SCIENCE
SWCAA ID: 2509

Air Discharge Permit 21-3465

Air Discharge Permit Application CO-1039

Issued: May 12, 2021

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Abbreviations

ADP	Air Discharge Permit
AP-42	Compilation of Emission Factors, AP-42, Fifth Edition, Volume 1, Stationary Point and Area Sources – published by the US Environmental Protection Agency
BACT	Best Available Control Technology
BART	Best Available Retrofit Technology
Btu	British thermal unit
Btu/scf	British thermal units per standard cubic feet
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO_2e	Carbon dioxide equivalent as defined in 40 CFR 98
EPA	U.S. Environmental Protection Agency
HAP	Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act
hp	Horsepower
LAER	Lowest Achievable Emission Rate
lb/hp/hr	Pounds per horsepower hour
lb/hr	Pounds per hour
lb/MMBtu	Pounds per million British thermal units
lb/MMscf	Pounds per million standard cubic feet
lb/yr	Pounds per year
MMBtu/hr	Millions of British thermal units per hour
MMscf	Millions of standard cubic feet
NO_X	Nitrogen oxides
PM	Particulate matter with an aerodynamic diameter less than 100 micrometers (includes both filterable particulate matter measured by EPA Method 5 and condensable particulate matter measured by EPA Method 202)
PM_{10}	Particulate matter with an aerodynamic diameter less than or equal to 10 micrometers (includes both filterable particulate matter measured by EPA Method 201 or 201A and condensable particulate matter measured by EPA Method 202)
$PM_{2.5}$	Particulate matter with an aerodynamic diameter less than or equal to 2.5 micrometers (includes both filterable particulate matter measured by EPA Method 201 or 201A and condensable particulate matter measured by EPA Method 202)
ppmvd @ X	Parts per million, dry volume basis, corrected to X% O_2
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
RACT	Reasonably Available Control Technology
RCW	Revised Code of Washington
SQER	Small Quantity Emission Rate listed in WAC 173-460
SO_2	Sulfur dioxide
SWCAA	Southwest Clean Air Agency
TAP	Toxic air pollutant pursuant to Chapter 173-460 WAC
T-BACT	Best Available Control Technology for toxic air pollutants
tpy	Tons per year
VOC	Volatile organic compound
WAC	Washington Administrative Code

1. FACILITY IDENTIFICATION

Applicant Name:	Applied Plant Science, Inc.
Applicant Address:	1625 Heritage Street, Woodland, WA 98674
Facility Name:	Applied Plant Science
Facility Address:	1625 Heritage Street, Woodland, WA 98674
Contact Person:	Scott Collins
SWCAA Identification:	2509
Primary Process:	Fertilizer manufacturing (mixing only)
SIC / NAICS:	2875 / 325314
Facility Classifications:	BACT / Minor Source

2. FACILITY DESCRIPTION

This facility blends dry and liquid fertilizer ingredients into proprietary liquid and dry formulations. All fertilizer blending activities are fully enclosed within the building envelope.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Air Discharge Permit Application number CO-1039 (ADP Application CO-1039) received by SWCAA on April 9, 2021. ADP Application CO-1039 requests approval to install a new 4.976 MMBtu/hr wastewater evaporator. The new evaporator will replace an existing 1.74 MMBtu/hr wastewater evaporator that is both undersized and requiring increasing maintenance. In addition, this permitting action will incorporate requirements from Notice to Correct 10211 to address the potential of odors from wastewater tank pump-outs or maintenance events.

4. PROCESS DESCRIPTION

Hot water is used when making liquid solutions from dry ingredients. Hot water is supplied by six natural-gas fired tankless hot water heaters and two identical 6.0 MMBtu/hr Camus boilers. Blending and material handling all occurs within the building envelope and not adjacent open doors or windows. In addition, the facility takes precautions to assure that no fertilizer ingredients can end up in stormwater, therefore fugitive emissions are expected to be negligible.

The wastewater evaporator will be used to evaporate wastewater from the process area that cannot be sent to the municipal sewer system due to the presence of dye and other fertilizer constituents. This wastewater is concentrated by the wastewater evaporator and the concentrated wastewater is periodically removed from the site.

Natural gas fired heaters are used to heat the facility as necessary and provide freeze protection in the process areas.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

5.a Camus Boiler 1. Two identical Camus boilers are used to provide hot water for mixing solutions from dry ingredients. The following details were available.

Make / Model:	Camus / DFNH-6014-MHO
Serial Number:	011724023
Year Built:	2017
Heat Input Capacity:	6.000 MMBtu/hr
Fuel:	Natural Gas
Burner Description:	Knitted stainless steel pre-mix burner

Stack Description:	~6" vent capped within ~12" "stack-in-stack" design exhausting vertically ~12' above ground level and 3' above the roof of the building housing the boilers. ~ 45°55'13.59"N, 122°45'52.26"W on the west side of the process building.

5.b Camus Boiler 2. Two identical Camus boilers are used to provide hot water for mixing solutions from dry ingredients. The following details were available.

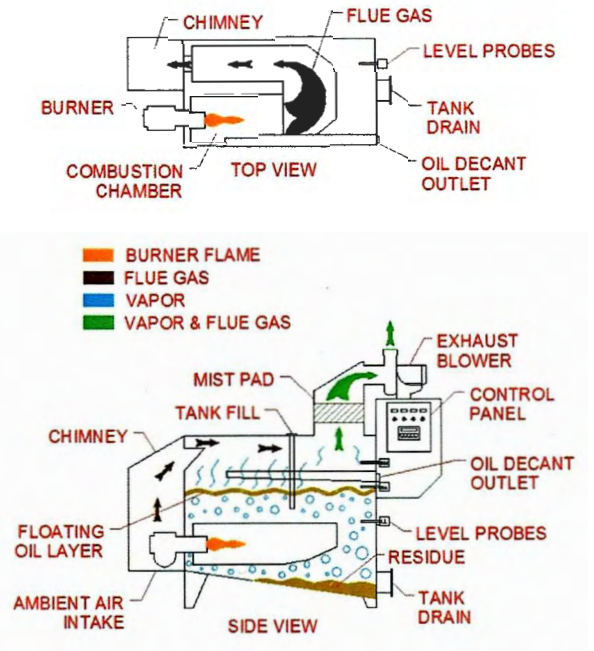
Make / Model:	Camus / DFNH-6014-MHO
Serial Number:	011724024
Year Built:	2017
Heat Input Capacity:	6.000 MMBtu/hr
Fuel:	Natural Gas
Burner Description:	Knitted stainless steel pre-mix burner
Stack Description:	~6" vent capped within ~12" "stack-in-stack" design exhausting vertically ~12' above ground level and 3' above the roof of the building housing the boilers. ~ 45°55'13.59"N, 122°45'52.26"W on the west side of the process building.

5.c Wastewater Evaporator *(new)*. The new wastewater evaporator replaces a smaller Encon model N66V-165. The wastewater evaporator will be used to evaporate wastewater from the process area that cannot be sent to the municipal sewer system due to the presence of dye and other fertilizer constituents. The evaporator will utilize a stainless steel mist pad on the evaporator discharge to prevent solids carryover into the exhaust. The evaporator will operate cyclically with wastewater filling continuing until the wastewater level reaches the high-level probe. When the evaporator has sufficiently concentrated the volume of the wastewater, the unit stops firing and pumps the concentrate out to the collection tank. The unit will not run dry. The following details were available:

Specifications:

Make / Model:	Encon / N66V4-438
Serial Number:	To be determined
Date Manufactured:	To be determined
Date Installed:	Installation expected in 2021
Rated Capacity:	438 gallons per hour evaporation rate, 4.976 MMBtu/hr heat input
Burner Make / Model:	(2) Eclipse / TA0300 (ThermAir)
Burner Capacity:	Each of the two burners has a heat input capacity of 3.425 MMBtu/hr (Eclipse advertises a range of 3.098 – 3.425 MMBtu/hr depending on blower size and chamber pressure
Mist Eliminator:	Stainless steel pad rated to 10 microns in compression fit housing drawer.
Stack Description:	~12″ diameter stack exhausting ~35′ above grade and 10′ above the building roof near the northwest corner of the building. ~45°55'15.47"N, 122°45'51.55"W. Estimated exhaust flow of 5,000 acfm at an exhaust temperature of 140°F (assuming a drop of ~30°F from the blower to the stack exit).

Burner exhaust is pulled back into the evaporator, mixed with the ambient air drawn across the surface of the boiling wastewater. The exhaust blower pulls the combined stream and gasses through the mist eliminator and pushes them up through the stack. The exhaust blower is designed to provide 6,000 acfm of combined steam and airflow. The blower is located at the evaporator exhaust downstream of the mist eliminator. Flow will be something below this value depending on the degree of cooling in the exhaust stack and any backpressure beyond the designed value. The exhaust will contain around 3,600 dscfm of non-condensable gases (N_2, O_2, CO_2) and up to 1,500 scfm of water vapor. The estimated temperature at the blower is 169°F (assuming little ambient heat loss). Water will begin to condense out around 156°F. Note that the exhaust stack diameter has been reduced from 16″ to 12″ in an attempt to increase exhaust velocity and plume rise in response to past odor concerns.



Encon Evaporator Flow Diagram (from Encon website 4/16/2021)

5.d Tankless Water Heaters. Six tankless water heaters can be used for the same purpose as the Camus Boilers (to provide hot water for mixing solutions from dry ingredients). Their use has been largely supplanted by the Camus Boilers. The units are advertised as achieving the SCAQMD Rule 1146.2 NO_X standard (55 ppmvd @ 3% O_2) that was effective January 1, 2000 to January 1, 2012. The following additional details were available:

Specifications:

Make / Model:	(4) Noritz model NC380-SV, (2) Noritz model N-132M
Heat Input Capacity:	0.380 MMBtu/hr each
Manufactured:	Unknown, however one serial number starts with "2006" – could be year of manufacture
Stack Description:	Exhausting through separate stacks through the roof on the north side of the building, ~25' above grade and 3' above the building roof. Three stacks at ~ 45°55'15.96"N, 122°45'50.92" and three stacks at ~ 45°55'15.82"N, 122°45'49.83"W.

5.e Space Heaters. Approximately 20 natural gas fired heaters are used to heat the facility as necessary and provide freeze protection in the process areas. The 12 forced air units have a combined heat input capacity of approximately 1.6 MMBtu/hr. SWCAA assumed the 8 radiant units have a combined heat input capacity of 0.4 MMBtu/hr (50,000 Btu/hr each).

5.f Equipment/Activity Summary.

ID No.	Generating Equipment/Activity	# of Units	Control Measure/Equipment	# of Units
1	Camus Boiler 1 (6.0 MMBtu/hr)	1	Low emission burners, Low sulfur fuel (natural gas)	1
2	Camus Boiler 2 (6.0 MMBtu/hr)	1	Low emission burners, Low sulfur fuel (natural gas)	1
3	Wastewater Evaporator (Encon model N66V4-438 (XH), 4.976 MMBtu/hr)	1	Capacity limitation, Low sulfur fuel (natural gas)	N/A
4	Tankless Water Heaters (0.380 MMBtu/hr each)	6	Low emission burners, Low sulfur fuel (natural gas)	6
5	Space Heaters	~20	Low sulfur fuel (natural gas)	N/A

6. EMISSIONS DETERMINATION

6.a Camus Boilers 1 and 2. Potential annual emissions (PTE) from the combustion of natural gas by these boilers were calculated with the assumption that the boilers will operate at full rated capacity for 8,760 hours per year. The boiler and burner system is designed to achieve a NO_X emission concentration of 9 ppmvd @ 3% O_2, however to provide a margin for compliance and for tuning to minimize products of incomplete combustion (e.g. CO), the permit limits NO_X emissions to 12 ppmvd @ 3% O_2.

Camus Boilers 1 and 2 (each)

Heat Input Rating =	6.00	MMBtu/hr
Natural Gas Heat Content =	1,020	Btu/scf for AP-42 emission factors
Natural Gas Heat Content =	1,026	Btu/scf for 40 CFR 98 GHG emission factors
Process Gas Firing Rate =	5,882	scfh
Process Gas Consumption =	51.53	MMscf/yr (based on 1,020 Btu/scf)

Pollutant	Emissions lb/MMscf	Emissions lb/MMBtu	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	15	0.015	0.087	0.38	12 ppmvd @ 3% O_2
CO	38	0.037	0.222	0.97	50 ppmvd @ 3% O_2
VOC	5.5	0.005	0.0324	0.142	AP-42 Section 1.4 (07/98)
SO_X as SO_2	0.6	0.001	0.0035	0.015	AP-42 Section 1.4 (07/98)
PM	7.6	0.007	0.0447	0.196	AP-42 Section 1.4 (07/98)
PM_{10}	7.6	0.007	0.0447	0.196	AP-42 Section 1.4 (07/98)
$PM_{2.5}$	7.6	0.007	0.0447	0.196	AP-42 Section 1.4 (07/98)
Benzene	0.0021	2.1E-06	1.2E-05	5.4E-05	AP-42 Section 1.4 (07/98)
Formaldehyde	0.075	7.4E-05	4.4E-04	1.9E-03	AP-42 Section 1.4 (07/98)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/MMscf	CO_2e tpy	Emission Factor Source
CO_2	53.06	1	116.98	120,019	3,074.16	40 CFR 98
CH_4	0.001	25	0.055	57	1.45	40 CFR 98
N_2O	0.0001	298	0.066	67	1.73	40 CFR 98
Total GHG - CO_2e			117.098	120,143	3,077.34	

In the future, emissions must be calculated using the emission factors identified above unless new emission factors are developed through source testing.

6.b Wastewater Evaporator. Potential annual emissions (PTE) from the combustion of natural gas were calculated with the assumption that the unit will operate at full rated capacity for 33% of the year (the maximum allowed by the permit). Based on a review of the types of materials that could be present in the wastewater, no significant emissions are expected from evaporation of the wastewater itself.

Wastewater Evaporator

Heat Input Rating =	4.976 MMBtu/hr
Natural Gas Heat Content =	1,020 Btu/scf for AP-42 emission factors
Natural Gas Heat Content =	1,026 Btu/scf for 40 CFR 98 GHG emission factors
Process Gas Firing Rate =	4,878 scfh
Annual Operation =	2,920 hours per year
Process Gas Consumption =	14.25 MMscf/yr

Pollutant	Emissions lb/MMscf	Emissions lb/MMBtu	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	99	0.097	0.483	0.71	Burner Mfg. (80 ppmvd)
CO	75	0.074	0.368	0.54	Burner Mfg. (100 ppmvd)
VOC	5.5	0.0054	0.0268	0.0392	AP-42 Section 1.4 (07/98)
SO_X as SO_2	0.6	0.0006	0.0029	0.0043	AP-42 Section 1.4 (07/98)
PM	7.6	0.0075	0.0371	0.0541	AP-42 Section 1.4 (07/98)
PM_{10}	7.6	0.0075	0.0371	0.0541	AP-42 Section 1.4 (07/98)
$PM_{2.5}$	7.6	0.0075	0.0371	0.0541	AP-42 Section 1.4 (07/98)
Benzene	0.0021	2.1E-06	1.0E-05	1.5E-05	AP-42 Section 1.4 (07/98)
Formaldehyde	0.075	7.4E-05	3.7E-04	5.3E-04	AP-42 Section 1.4 (07/98)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/MMscf	CO_2e tpy	Emission Factor Source
CO_2	53.06	1	116.98	120,019	849.84	40 CFR 98
CH_4	0.001	25	0.055	57	0.40	40 CFR 98
N_2O	0.0001	298	0.066	67	0.48	40 CFR 98
Total GHG - CO_2e			117.098	120,143	850.71	

In the future, emissions must be calculated using the emission factors identified above unless new emission factors are developed through source testing.

6.c Tankless Water Heaters. Potential annual emissions (PTE) from the combustion of natural gas by these units were calculated with the assumption that the units will operate at full rated capacity for 8,760 hours per year.

Tankless Water Heaters (all 6 water heaters combined)

Heat Input Rating =	2.28	MMBtu/hr
Natural Gas Heat Content =	1,020	Btu/scf for AP-42 emission factors
Natural Gas Heat Content =	1,026	Btu/scf for 40 CFR 98 GHG emission factors
Process Gas Firing Rate =	2,235	scfh
Process Gas Consumption =	19.58	MMscf/yr

Pollutant	Emissions lb/MMscf	Emissions lb/MMBtu	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	68	0.067	0.152	0.67	SCAQMD Rule 1146.2
CO	84	0.0824	0.188	0.82	AP-42 Section 1.4 (07/98)
VOC	5.5	0.0054	0.0123	0.0538	AP-42 Section 1.4 (07/98)
SO_X as SO_2	0.6	0.0006	0.0013	0.0059	AP-42 Section 1.4 (07/98)
PM	7.6	0.0075	0.0170	0.0744	AP-42 Section 1.4 (07/98)
PM_{10}	7.6	0.0075	0.0170	0.0744	AP-42 Section 1.4 (07/98)
$PM_{2.5}$	7.6	0.0075	0.0170	0.0744	AP-42 Section 1.4 (07/98)
Benzene	0.0021	2.1E-06	4.7E-06	2.1E-05	AP-42 Section 1.4 (07/98)
Formaldehyde	0.075	7.4E-05	1.7E-04	7.3E-04	AP-42 Section 1.4 (07/98)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/MMscf	CO_2e tpy	Emission Factor Source
CO_2	53.06	1	116.98	120,019	1,168.18	40 CFR 98
CH_4	0.001	25	0.055	57	0.55	40 CFR 98
N_2O	0.0001	298	0.066	67	0.66	40 CFR 98
Total GHG - CO_2e			117.098	120,143	1,169.39	

In the future, emissions must be calculated using the emission factors identified above unless new emission factors are developed through source testing.

6.d Space Heaters. Potential annual emissions (PTE) from the combustion of natural gas by these units were calculated with the assumption that the units will operate at full rated capacity for 8,760 hours per year.

Space Heaters (represents combined potential of ~20 units)

Heat Input Rating =	2.00 MMBtu/hr
Natural Gas Heat Content =	1,020 Btu/scf for AP-42 emission factors
Natural Gas Heat Content =	1,026 Btu/scf for 40 CFR 98 GHG emission factors
Process Gas Firing Rate =	1,961 scfh
Process Gas Consumption =	17.18 MMscf/yr

Pollutant	Emissions lb/MMscf	Emissions lb/MMBtu	Emissions lb/hr	Emissions tpy	Emission Factor Source
NO_X	100	0.0980	0.196	0.86	AP-42 Section 1.4 (07/98)
CO	84	0.0824	0.165	0.72	AP-42 Section 1.4 (07/98)
VOC	5.5	0.0054	0.0108	0.0472	AP-42 Section 1.4 (07/98)
SO_X as SO_2	0.6	0.0006	0.0012	0.0052	AP-42 Section 1.4 (07/98)
PM	7.6	0.0075	0.0149	0.0653	AP-42 Section 1.4 (07/98)
PM_{10}	7.6	0.0075	0.0149	0.0653	AP-42 Section 1.4 (07/98)
$PM_{2.5}$	7.6	0.0075	0.0149	0.0653	AP-42 Section 1.4 (07/98)
Benzene	0.0021	2.1E-06	4.1E-06	1.8E-05	AP-42 Section 1.4 (07/98)
Formaldehyde	0.075	7.4E-05	1.5E-04	6.4E-04	AP-42 Section 1.4 (07/98)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/MMscf	CO_2e tpy	Emission Factor Source
CO_2	53.06	1	116.98	120,019	1,024.72	40 CFR 98
CH_4	0.001	25	0.055	57	0.48	40 CFR 98
N_2O	0.0001	298	0.066	67	0.58	40 CFR 98
Total GHG - CO_2e			117.098	120,143	1,025.78	

In the future, emissions must be calculated using the emission factors identified above unless new emission factors are developed through source testing.

6.e Facilitywide Potential Emissions (PTE) Summary.

Air Pollutant	Potential to Emit (tpy)	Project Impact (tpy)
NO_X	3.00	-0.22
CO	4.02	-0.026
VOC	0.42	-0.0019
SO_2	0.05	-0.00021
Lead	0	0
PM	0.59	0.0027
PM_{10}	0.59	0.0027
$PM_{2.5}$	0.59	0.0027
CO_2/CO_2e	9,201	-42
Total TAPs	$5.94*10^{-3}$	$5.69*10^{-5}$
Total HAPs	$5.94*10^{-3}$	$5.69*10^{-5}$

Toxic/Hazardous Air Pollutant [CAS #]	Potential to Emit (pounds per year)	Project Impact (pounds per year)
Benzene [71-43-2]	0.32	-0.0015
Formaldehyde [50-0-0]	11.9	-0.052

7. REGULATIONS AND EMISSION STANDARDS

Regulations have been established for the control of emissions of air pollutants to the ambient air. Regulations applicable to the proposed facility that have been used to evaluate the acceptability of the proposed facility and establish emission limits and control requirements include, but are not limited to, the following regulations, codes, or requirements. These items establish maximum emissions limits that could be allowed and are not to be exceeded for new or existing facilities. More stringent limits are established in this Permit consistent with implementation of Best Available Control Technology (BACT):

7.a Revised Code of Washington (RCW) 70A.15.2040 empowers any activated air pollution control authority to prepare and develop a comprehensive plan or plans for the prevention, abatement and control of air pollution within its jurisdiction. An air pollution control authority may issue such orders as may be necessary to effectuate the purposes of the Washington Clean Air Act [RCW 70A.15] and enforce the same by all appropriate administrative and judicial proceedings subject to the rights of appeal as provided in Chapter 62, Laws of 1970 ex. sess.

7.b RCW 70A.15.2210 provides for the inclusion of conditions of operation as are reasonably necessary to assure the maintenance of compliance with the applicable ordinances, resolutions, rules and regulations when issuing an Order of Approval (Air Discharge Permit) for installation and establishment of an air contaminant source.

7.c Washington Administrative Code (WAC) 173-460 "Controls for New Sources of Toxic Air Pollutants" (as in effect August 21, 1998) requires Best Available Control Technology for toxic air pollutants (T-BACT), identification and quantification of emissions of toxic air pollutants and demonstration of protection of human health and safety.

7.d WAC 173-476 "Ambient Air Quality Standards" establishes ambient air quality standards for PM_{10}, $PM_{2.5}$, lead, sulfur dioxide, nitrogen dioxide, ozone, and carbon monoxide in the ambient air, which shall not be exceeded.

7.e SWCAA 400-040 "General Standards for Maximum Emissions" requires all new and existing sources and emission units to meet certain performance standards with respect to Reasonably Available Control Technology (RACT), visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust.

7.f SWCAA 400-040(1) "Visible Emissions" requires that no emission of an air contaminant from any emissions unit shall exceed twenty percent opacity for more than three minutes in any one hour at the emission point, or within a reasonable distance of the emission point.

7.g SWCAA 400-040(2) "Fallout" requires that no emission of particulate matter from any source shall be deposited beyond the property under direct control of the owner(s) or operator(s) of the source in sufficient quantity to interfere unreasonably with the use and enjoyment of the property upon which the material is deposited.

7.h SWCAA 400-040(3) "Fugitive Emissions" requires that reasonable precautions be taken to prevent the fugitive release of air contaminants to the atmosphere.

7.i SWCAA 400-040(4) "Odors" requires that any person who shall cause or allow the generation of any odor from any source, which may unreasonably interfere with any other property owner's use and enjoyment of their property use recognized good practices and procedures to reduce these odors to a reasonable minimum.

7.j SWCAA 400-050 "Emission Standards for Combustion and Incineration Units" requires that all provisions of SWCAA 400-040 be met and that no person shall cause or permit the emission of particulate matter from any combustion or incineration unit in excess of 0.23 grams per dry cubic meter (0.1 grains per dry standard cubic foot) of exhaust gas at standard conditions.

7.k SWCAA 400-109 "Air Discharge Permit Applications" requires that an air discharge permit application be submitted for all new installations, modifications, changes, or alterations to process and emission control equipment consistent with the definition of "new source." Sources wishing to modify existing permit terms may submit an Air Discharge Permit application to request such changes. An air discharge permit must be issued, or written confirmation of exempt status must be received, before beginning any actual construction, or implementing any other modification, change, or alteration of existing equipment, processes, or permits.

7.l SWCAA 400-110 "New Source Review" requires that an Air Discharge Permit be issued by SWCAA prior to establishment of the new source, emission unit, or modification in response to an Air Discharge Permit application.

7.m SWCAA 400-113 "Requirements for New Sources in Attainment or Nonclassifiable Areas" requires that no approval to construct or alter an air contaminant source shall be granted unless it is evidenced that:

(1) The equipment or technology is designed and will be installed to operate without causing a violation of the applicable emission standards;
(2) Best Available Control Technology will be employed for all air contaminants to be emitted by the proposed equipment;
(3) The proposed equipment will not cause any ambient air quality standard to be exceeded; and
(4) If the proposed equipment or facility will emit any toxic air pollutant regulated under WAC 173-460, the proposed equipment and control measures will meet all the requirements of that Chapter.

The facility is located in an area that is in attainment or nonclassifiable for each criteria air pollutant, therefore this regulation is applicable to this facility.

8. RACT/BACT/BART/LAER/PSD/CAM DETERMINATIONS

The proposed equipment and control systems incorporate Best Available Control Technology (BACT) for the types and amounts of air contaminants emitted by the processes as described below:

New BACT Determination

8.b BACT Determination – Wastewater Evaporator. The applicant proposes to utilize a unit with standard (not low emission) burners. The applicant reviewed the option of alternative evaporators from other manufactures and did not find a comparable lower-emitting unit. A low emission burner set is available for the proposed evaporator at an estimated premium of "at least" $50,000. It is estimated that the low emission burners will reduce NO_X emissions from 80 ppmvd @ 3% O_2 to 30 ppmvd @ 3% O_2 and CO emissions from 100 ppmvd @ 3% O_2 to 50 ppmvd @ 3% O_2. An equipment life of 10 years was used for the cost-effectiveness analysis under the assumption that the new evaporator will last longer than the similar evaporator it replaces (which lasted approximately 5 years and is made by the same manufacturer). A 7% cost of capital was used for the cost-effectiveness calculations. At a 100% capacity factor, assuming the burner fires at 100% rate at all times, the low-emission burners reduce NO_X emissions at a cost of approximately $5,381 per ton. This analysis indicates that use of the low-emission burners is a cost-effective method of reducing NO_X emissions and therefore required as BACT if the capacity factor is not limited. Alternatively, if the annual capacity factor is limited to 33%, the cost-effectiveness rises to approximately $16,144 per ton and the use of low-emission burners is not expected to be cost-effective, therefore the use of standard burners will meet the requirement to utilize BACT if the capacity factor is limited to 33%.

Alternative fuels, including electricity are also a BACT option. In this case, an evaporator of this size would require over 1.2 MW of electrical power, and cost an extra $147,000 per year in energy costs based on a natural gas price of approximately $10 per 1,000 scf and an electrical price of $0.08/kW. Installing sufficient electrical service capacity would be an additional cost. In this case, the use of electricity is not a cost-effective means of limiting emissions. Note that Encon, the manufacturer of the proposed evaporator, does not make electrical evaporators of a comparable size so many, smaller, units would be required.

Pre-Existing BACT Determinations

8.b BACT Determination – Camus Boilers. These boilers use natural gas in a pre-mixed fiber mesh burner designed to achieve nitrogen oxides (NO_X) emissions at or below 9 ppmvd @ 3% O_2. SWCAA believes that limiting NO_X emissions to 12 ppmvd @ 3% O_2 and carbon monoxide (CO) emissions to 50 ppmvd @ 3% O_2 combined with periodic performance monitoring meets the requirements of BACT for the two Camus boilers. While CO emissions levels are not guaranteed by the manufacturer, SWCAA believes these units are capable of maintaining emissions below 50 ppmvd @ 3% O_2 based on the initial source emissions testing results from November 2017, testing results from similar burners, the manufacturer's suggested setup CO levels of less than 100 ppm, and the fact that SWCAA is setting the NO_X limit at a level slightly higher than the manufacturer's advertised capability. SWCAA believes it is appropriate to set the NO_X limit at 12 ppmvd @ 3% O_2 to allow for greater ability to tune for minimum production of carbon monoxide and related products of incomplete combustion and to allow a reasonable margin for compliance.

8.c BACT Determination – Wastewater Evaporator. The use of a larger unit (but capable of lower emissions) in place of the proposed unit with standard burners reduces NO_X and CO emissions from approximately 100 ppmvd @ 3% O_2 and 100 ppmvd @ 3% O_2 respectively to approximately 30 ppmvd @ 3% O_2 and 50 ppmvd @ 3% O_2 respectively. The larger unit referenced in this example (a Lakeview XLT) costs approximately $120,000 more. Assuming that the larger unit used in this analysis was suitable for this application and was used to evaporate the same amount of wastewater at the same efficiency, this would prevent up to 0.47 tons per year of NO_X and 0.35 tons per year of CO assuming 100% capacity utilization of the proposed unit. Using a 7% cost of capital and a 20 year equipment life, this would result in a NO_X cost-effectiveness of ~$17,000 per ton and a combined NO_X and CO cost-effectiveness of ~$12,000 per ton. The applicant was unable to find other low-emission units that might

be applicable to this application. Based on this analysis, use of the proposed natural-gas fired Encon wastewater evaporator with standard burners meets the requirements of BACT with emission limits for NO_X and CO based on 100 ppmvd @ 3% O_2 for each pollutant.

Other Determinations

8.d Prevention of Significant Deterioration (PSD) Applicability Determination. This permitting action will not result in a potential increase in emissions equal to or greater than the PSD thresholds. Therefore, PSD review is not applicable to this action.

8.e Compliance Assurance Monitoring (CAM) Applicability Determination. CAM is not applicable to any emission unit at this facility because it is not a major source and is not required to obtain a Part 70 permit.

9. AMBIENT IMPACT ANALYSIS

Incremental increases in toxic air pollutant emissions will not exceed the applicable Small Quantity Emission Rates (SQER) listed in WAC 173-460 (in effect August 21, 1998) therefore, toxic impacts are presumed to be below regulatory significance. Potential emissions of criteria air pollutants (nitrogen oxides, carbon monoxide, sulfur dioxide, PM_{10}) and volatile organic compounds are all at or below 4.0 tons per year each from the facility from all sources combined. At these emission rates, no adverse ambient air quality impact is anticipated.

Conclusions

9.a Operation of the fertilizer manufacturing facility as proposed in ADP Application CO-1039 will not cause the ambient air quality standards established by Title 40 Code of Federal Regulations Part 50 (40 CFR 50), "National Primary and Secondary Ambient Air Quality Standards" to be violated.

9.b The proposed equipment at the fertilizer manufacturing facility, if properly installed and maintained, can be operated without causing a violation of the applicable emission standards, which include the limits established under SWCAA 400-040 "General Standards for Maximum Emissions."

9.c Operation of the fertilizer manufacturing facility as proposed in ADP Application CO-1039 will not cause the requirements of WAC 173-460 "Controls for New Sources of Toxic Air Pollutants," (in effect August 21, 1998) or WAC 173-476 "Ambient Air Quality Standards" to be violated.

10. DISCUSSION OF APPROVAL CONDITIONS

SWCAA has made a determination to issue Air Discharge Permit 21-3465 in response to ADP Application CO-1039. Air Discharge Permit 21-3465 contains approval requirements deemed necessary to assure compliance with applicable regulations and emission standards as discussed below.

10.a General Basis. Approval conditions for equipment affected by this permitting action incorporate the operating schemes proposed by the permittee in the Air Discharge Permit application.

10.b Emission Limits. See Section 8 for a discussion of short term limits for the Camus boilers. Annual emission limits for the Camus boilers were based on the assumption that the units could be operated for 8,760 hours per year at full capacity at the permitted emission concentrations.

The short term emission limits for the Wastewater Evaporator were based on manufacturer data. The manufacturer indicated that NO_X emissions were expected to be up to 75 ppmvd @ 3% O_2 at the higher end of the firing range, therefore the applicant suggested a limit of 80 ppmvd @ 3% O_2 to allow for a small margin of compliance. Since the 75 ppm level was not a guarantee, emissions could be somewhat higher so this suggestion

is reasonable. The 100 ppm CO limit is the based on the range provided by Encon literature supplied with the application.

10.c Operating Limits and Requirements. To minimize the impact of emissions on ambient air quality, the discharges from the Camus boilers and the Wastewater Evaporator are required to be exhausted vertically above the level of the roof in which the units are housed. Any device that obstructs or prevents vertical discharge (such as a traditional rain cap) is prohibited. This is good engineering practice and is required by SWCAA 400-200(1).

The boiling wastewater in the evaporator will contain solids and aerosols that could be carried out the exhaust stack if a robust demister is not in use, causing PM emissions and potentially contributing to an odor nuisance. For this reason, a monthly inspection of the demister was required.

The total annual capacity factor of the Wastewater Evaporator must be limited to ~33% (14.25 MMscf per year) to avoid the need to install low-emission burners. This limit would still provide the ability to evaporate approximately 3.8 times as much water as evaporated in the maximum past year (2020).

NOV 10211 was issued in 2020 in response to odors generated during pump-out of a wastewater tank. On May 22, 2020 SWCAA issued Notice to Correct 10211. Notice to Correct 10211 required that Applied Plant Science submit a plan outlining actions to minimize odors from this activity and ensure compliance with SWCAA 400-040(4)(a). Elements of this plan were incorporated into the Air Discharge Permit requiring that all powered discharge be passed through an activated carbon drum or equivalent or superior control system approved by SWCAA.

10.d Monitoring and Recordkeeping. Sufficient monitoring and recordkeeping was established to document compliance with the annual emission limits and provide for general requirements (e.g. upset reporting, annual emission inventory submission).

Monthly fuel consumption records may consist of monthly billing summaries from the natural gas supplier.

10.e Emission Monitoring and Testing Requirements. See Section 12.

10.f Reporting. Specific reporting deadlines were established for each reporting requirement. The submittal date refers to the earlier of the date the report is delivered to SWCAA or the postmarked date if sent through the US Post Office.

Upset conditions with the potential to cause excess emissions must be reported immediately in order to qualify for relief from penalty in accordance with SWCAA 400-107 for unavoidable exceedances. In addition, prompt reporting allows for prompt and accurate investigation into the cause of the event and the prevention of similar future incidents.

The permit requires reporting of the annual air emissions inventory, and reporting of the data necessary to develop the emission inventory. The total amount of natural gas consumed by Camus Boiler #1, Camus Boiler #2, the Wastewater Evaporator and the Tankless Water Heaters (all 6 tankless heaters combined) must be detailed separately because all of these units can utilize different emission factors. Because it is not expected that most individual units will be equipped with fuel meters and emissions from individual units are relatively minor, fuel use may be apportioned between individual units using operating records where direct fuel consumption is not measured. Some amount of individual judgment will necessarily be involved in how the operating records are used for this purpose.

11. START-UP AND SHUTDOWN/ALTERNATIVE OPERATING SCENARIOS/POLLUTION PREVENTION

11.a Start-up and Shutdown Provisions. Pursuant to SWCAA 400-081 "Start-up and Shutdown," technology based emission standards and control technology determinations shall take into consideration the physical and operational ability of a source to comply with the applicable standards during start-up or shutdown. Where it is determined that a source is not capable of achieving continuous compliance with an emission standard during start-up or shutdown, SWCAA shall include appropriate emission limitations, operating parameters, or other criteria to regulate performance of the source during start-up or shutdown.

The permittee did not identify any startup and shutdown periods during which the proposed equipment is not capable of achieving continuous compliance with any applicable emission standard or approval condition. Therefore, specific startup and shutdown provisions were not included in the permit.

11.b Alternate Operating Scenarios. SWCAA conducted a review of alternate operating scenarios applicable to equipment affected by this permitting action. The permittee did not propose or identify any applicable alternate operating scenarios. Therefore, none were accommodated by the approval conditions.

11.c Pollution Prevention Measures. SWCAA conducted a review of possible pollution prevention measures for the facility. No pollution prevention measures were identified by either the permittee or SWCAA separate or in addition to those measures required under BACT considerations. Therefore, none were included in the permit requirements.

12. EMISSION MONITORING AND TESTING

Performance monitoring of Camus Boiler #1, Camus Boiler #2, and the Wastewater Evaporator with a combustion analyzer or equivalent is required at least annually. In SWCAA's experience this monitoring is relatively inexpensive compared to the quantity of emissions that can be prevented by this procedure. It is unlikely that emissions will degrade rapidly enough that more frequent monitoring is necessary to maintain proper operation. In addition, more comprehensive source emissions testing of Camus Boiler #1 and Camus Boiler #2 is required initially and by the end of November every 5 years following the initial source test. Potential emissions from the wastewater evaporator were too small to warrant more comprehensive source testing. SWCAA believes that this testing regime provided a reasonable assurance of on-going compliance with the permitted emission limits.

13. FACILITY HISTORY

13.a Previous Approvals. The following permits and approvals have been issued for this facility:

Permit Number	Application #	Date Issued	Description
18-3264	CO-980	2/7/2018	Approval to install two new 6.0 MMBtu/hr boilers and one 1.74 MMBtu/hr wastewater evaporator.

Bold font indicates that the Order or Air Discharge Permit will have been superseded or will no longer be in effect when Air Discharge Permit 21-3465 is issued.

14. PUBLIC INVOLMENT

14.a Public Notice for Air Discharge Permit Application CO-1039. Public notice for Air Discharge Permit Application CO-1039 was published on the SWCAA internet website for a minimum of 15 days beginning on April 9, 2021.

14.b Public/Applicant Comment for Air Discharge Permit Application CO-1039. SWCAA did not receive formal comments, a comment period request, or any other inquiry from the public or the applicant regarding this Air Discharge Permit application. Therefore, no public comment period was provided for this permitting action.

14.c State Environmental Policy Act. SWCAA issued Determination of Non-Significance 21-016 on May 12, 2021 for this permitting action.