TECHNICAL SUPPORT DOCUMENT

BIO RECYCLING CORPORATION
BIO RECYCLING CENTRALIA PLANT - DBA Northwest Fertilizer Company

SWCAA ID: 2167

Air Discharge Permit SWCAA 20-3440

ADP Application L-713

Issued: November 12, 2020

Prepared By: Clint Lamoreaux
Air Quality Engineer
Southwest Clean Air Agency

TABLE OF CONTENTS

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
CAM	Compliance assurance monitoring (40 CFR 64)
CFR	Code of Federal Regulations
CO	Carbon monoxide
EPA	U.S. Environmental Protection Agency
Gph	Gallons per hour
HAP	Hazardous air pollutant listed pursuant to Section 112 of the Federal Clean Air Act
LAER	Lowest achievable emission rate
lb/hr	Pounds per hour
lb/yr	Pounds per year
MMBtu/hr	Millions of British thermal units per hour
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)
ppm	Parts per million
ppmvd	Parts per million, dry volume basis
ppmvd @ X	Parts per million, dry volume basis corrected to X
PSD	Prevention of Significant Deterioration
RACT	Reasonably Available Control Technology
RCW	Revised Code of Washington
scfm	Standard (68 °F, 1 atmosphere) cubic feet per minute
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: Bio Recycling Corporation
Applicant Address: P.O. Box 982, Centralia, Washington 98531

Facility Name: Bio Recycling Centralia Plant – DBA Northwest Fertilizer Company
Facility Address: 2109 Foron Road, Centralia, Lewis County, Washington 98531
SWCAA Identification: 2167
Contact Person: Mr. Brian Hickey

Primary Process: Septage Receiving and Processing
SIC / NAICS: 4953 / 562219
Facility Classifications: Natural Minor

2. FACILITY DESCRIPTION

Bio Recycling Corporation receives lime-stabilized septage from a variety of sources. The material is used as an agricultural fertilizer after processing.

3. CURRENT PERMITTING ACTION

This permitting action is in response to Air Discharge Permit Application number L-713 (ADP Application L-713) received July 22, 2020. ADP Application L-713 requests approval to replace the wet oxidation scrubber that currently treats odorous emissions from the Class A Biosolids Manufacturing Equipment and Septage Receiving Station with the following two units:

a. A packed bed scrubber for the Class A Biosolids Manufacturing Equipment. The packed bed scrubber will utilize dilute sulfuric acid to treat ammonia and amine emissions.
b. A carbon bed for the Septage Receiving Station. The carbon bed is designed to treat H_2S emissions from raw septage.

ADP 20-3440 will superseded ADP 08-2805 in its entirety.

4. PROCESS DESCRIPTION

Septage is received at the facility, lime stabilized, and transferred to enclosed vessels for holding or processing. The Septage Receiving sump is enclosed and will be vented to the new carbon bed to control H_2S and other odorous compounds. Some material is simply held at an elevated pH to reduce microbial populations prior to use as an agricultural fertilizer. Some material is further dewatered and heat treated to produce a Class A biosolids material. The dewatering and heat treatment processes is enclosed and air from the enclosure will be vented to the new dilute sulfuric acid scrubber. Process heat is provided by a 250 horsepower natural gas-fired boiler as necessary. The facility may operate 8,760 hours per year.

5. EQUIPMENT/ACTIVITY IDENTIFICATION

5.a Burnham Boiler. This boiler provides heat for septage processing. Specific boiler information is listed below:

Make:	Burnham
Model:	3P-250
Boiler Serial Number:	11679
Year Manufactured:	1979
Year Installed:	2003
Heat Output Rating:	250 boiler horsepower
Gas Heat Input Rating:	10.46 MMBtu/hr
Fuel:	Natural gas

Burner Make:	Webster
Burner Model:	JB 3 Cyclonox Low NO_X burner with induced flue gas recirculation
Stack Diameter:	22.5" inside diameter
Stack Height:	15 feet
Federal Regulations:	None – this boiler pre-dates 40 CFR 60 Subpart Dc.

5.b Lime Storage Silo. The silo is pneumatically loaded with lime (currently in the form of CaO) from trucks at a rate of approximately 15-30 tons per hour. Specific silo and associated dust collector information is listed below.

Silo Make/Model:	Diversified Storage Systems – Positive Feed Silos / Model 1400
Year Installed:	~1995
Silo Capacity:	1,400 cubic feet
Silo Height:	37 feet above grade
Dust Collector Make/Model:	Belgrade Steel Tank Company / Belle 150 Dust House
Number of Bags:	18 bags measuring 8" in diameter by 48" long
Cleaning Method:	Air vibrator shaker
Cloth Area:	151 ft^2
Filter Media:	PE 37 100% polyester, 9 oz.
Design Exhaust Flow:	375 acfm

The manufacturer indicates that the exhaust would be controlled to 0.01 gr/scf based on the storage of cement dust. Based on the equipment specifications, SWCAA expects that the particulate matter concentration in the effluent gas will not exceed an average of 0.005 gr/dscf when used on the Lime Storage Silo.

5.c Class A Biosolids Manufacturing Equipment. The Class A Biosolids Manufacturing Equipment consists of a custom-built arrangement of enclosed tanks and a cylindrical screw press that feeds either a tipping hopper or a 3,000 lb/hr Redbow Biosludge Sterilizer. Bio Recycling estimates that the equipment can process approximately 200,000 gallons per day of liquid material. Because the Class A Biosolids Manufacturing Equipment produces significant amounts of ammonia when handled and heated, the Permittee has enclosed the processing equipment and vents the air from the discharge conveyor of the enclosed processing equipment to a packed bed wet scrubber. This scrubber will be replaced with the scrubber described below. This captures gases escaping from the enclosure with the product and any gases escaping from the product as it is being conveyed.

Packed Bed Scrubber Details

The Packed Bed Scrubber is designed to reduce the odor caused primarily by ammonia and amine compounds in the exhaust stream.

Make / Model:	Ecoverde / EG-ChemPac
Treatment Capacity:	2,000 cubic feet per minute (cfm)
Packing:	5' of 2" polypropylene Q-PAC® packing material in a 2.5' diameter shell
Sump Volume:	60 gallons
Scrubbing Solution:	dilute sulfuric acid with a target pH of 3.6
Recirculation Rate:	25 gallons per minute
Design Blowdown:	3.0 gallons per hour. Monitored by rotatmeter, regulated by valve.
Control Efficiency:	99% for ammonia at inlet concentration of 250 ppm
Stack Description:	14" diameter exhausting at ~5' above roof peak and approximately 26' above grade

Processed liquid is stored in two 33,000 gallons storage tanks. Processed solids are stored in a drop box or other contained structure.

5.d Septage Receiving Station. Trucks discharge septage into an enclosed (not sealed) sump area that will be vented to the new carbon bed for the control of H_2S and odorous emissions.

Carbon Bed Details

The Packed Bed Scrubber is designed to reduce the odor caused primarily by ammonia and amine compounds in the exhaust stream.

Make / Model:	Ecoverde / EG-CVS dry media adsorber
Treatment Capacity:	2,000 cubic feet per minute (cfm)
Media:	92 ft^3 of activated carbon EGC-H2S-30 with a bed diameter of 6.5 ~80% EGC-H_2S-30 (0.3 g/cc H_2S capacity), ~20% EGC-PW activated carbon
Control Efficiency:	Not specified. SWCAA expects 99% control for properly designed and managed system. System is sized to treat up to 50 ppm H_2S for one hour per day.
Stack Description:	14" diameter, exhausting ~ 9' 6" above grade.

5.e Equipment/Activity Summary.

ID No.	Generating Equipment/Activity	# of Units	Control Equipment	# of Units
1	Burnham Boiler	1	Low-NO_X Burner – Induced FGR	1
2	Lime Storage Silo	1	Fabric Filter Dust Collector	1
3	Class A Biosolids Manufacturing Equipment	1	Packed Bed Wet Scrubber	1
4	Septage Receiving	1	Carbon Bed	1

6. EMISSIONS DETERMINATION

6.a Burnham Boiler. The Burnham Boiler will be operated solely on natural gas. The boiler utilizes a "low-NO_X" burner package with anticipated emission concentrations of 30 ppmvd NO_X @ 3% O_2 and 12 ppmvd CO @ 3% O_2, or better. In order to assure a wider tuning latitude to minimize NO_X emissions, CO emissions of 50 ppmvd @ 3% O_2 were assumed. Annual emissions were estimated conservatively using the assumption that the boiler is operated at full rated load for 8,760 hours per year.

250 Horsepower Burnham Boiler

Heat Rate =	10.460	MMBtu/hr
Natural Gas Heat Value =	1,020	Btu/scf for AP-42 emission factors
Natural Gas Heat Value =	1,026	Btu/scf for 40 CFR 98 GHG emission factors
Capacity Factor =	100%	
Fuel Consumption =	89.83	MMscf/yr

Pollutant	ppmvd @ 3% O_2	Emission Factor lb/MMBtu	Emission Factor lb/MMscf	lb/hr	tpy	Emission Factor Source
NO_X	30	0.0364	37.1	0.381	1.67	Webster (burner mfg)
CO	50	0.0370	37.7	0.386	1.69	Webster (burner mfg)
VOC		0.0054	5.5	0.0564	0.247	AP-42 Sec. 1.4 (7/98)
SO_X as SO_2		0.00059	0.6	0.00615	0.0269	AP-42 Sec. 1.4 (7/98)
PM		0.0075	7.6	0.0779	0.341	AP-42 Sec. 1.4 (7/98)
PM_{10}		0.0075	7.6	0.0779	0.341	AP-42 Sec. 1.4 (7/98)
$PM_{2.5}$		0.0075	7.6	0.0779	0.341	AP-42 Sec. 1.4 (7/98)
Benzene		2.06E-06	0.0021	2.2E-05	9.4E-05	AP-42 Sec. 1.4 (7/98)
Formaldehyde		7.35E-05	0.075	7.7E-04	3.4E-03	AP-42 Sec. 1.4 (7/98)

Greenhouse Gases	kg/MMBtu	GWP	CO_2e lb/MMBtu	CO_2e lb/MMscf	tpy, CO_2e	Emission Factor Source
CO_2	53.06	1	116.98	120,019	5,359.3	40 CFR 98
CH_4	0.001	25	0.055	56.55	2.5	40 CFR 98
N_2O	0.0001	298	0.066	67.41	3.0	40 CFR 98
Total GHG - CO_2e			117.098	120,143	5,364.8	

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

6.b Lime Storage Silo. Assuming a maximum emission concentration of 0.005 gr/dscf, an exhaust flowrate of 375 dscfm during loading and 48 hours of loading per year (two 30-ton loads per month at an off-loading rate of 15 tons per hour), maximum $PM/PM_{10}/PM_{2.5}$ emissions will be 1 pound per year.

6.c Class A Biosolids Manufacturing Equipment. The incoming material for this process is at a pH of approximately 12. At this elevated pH ammonia may be liberated from the material, especially after dewatering. The solid portion of the incoming material has an ammonia nitrogen content of approximately 2.1%. With a maximum solids processing rate of 2,000 pounds per hour, the ammonia throughput potential is 42 pounds per hour. Some percentage of this ammonia will be retained in the solids, and some will be exhausted to the air during processing. Inspections by SWCAA personnel and a limited amount of colorimetric detector tube testing by the applicant suggests that only a small percentage of the ammonia nitrogen is being exhausted to the ambient air, but ammonia concentrations of 250 ppm have been measured (equivalent to ~1.6 pounds per hour).

The scrubber is designed to reduce ammonia emissions by 99%, and based on this SWCAA established an emission limit of 3.0 ppmvd (1-hour average) consistent with BACT.

Ammonia Emissions From Class A Manufacturing Equipment	
Annual Hours of Operation =	8,760
Average NH_3 Exhaust Concentration =	3.0 ppmvd
Exhaust Rate =	2,000 dscfm
Molecular Weight of NH_3 =	17.03
Ammonia Emission Rate =	0.016 lb/hr
Annual Ammonia Emissions =	139 lbs

6.d Septage Receiving. The carbon bed treats 2,000 dscfm of gas drawn from the sump enclosure. SWCAA has assumed a maximum average outlet concentration of 0.5 ppmvd based on the assumption that a well-designed and operated system can control 99% of H_2S, and maximum inlet H_2S will not exceed 50 ppm. Tested H_2S concentrations have been well below 50 ppmvd. Potential annual emissions of hydrogen sulfide were calculated using the assumption that the system treats 2,000 cfm of gas for 2,600 hours per year (10 hours per day, 5 days per week), and the exhaust averages 0.5 ppmvd H_2S.

Septage Receiving	
Flow =	2,000 cfm
H_2S Content =	0.5 ppm
Hours of Operation =	2,600 hours
H_2S Emission Rate =	0.0053 lb/hr
Annual H_2S Emissions =	13.8 lb/yr

6.e Facilitywide Potential Emissions Summary.

Pollutant	Potential Annual Emissions (tpy)
Nitrogen oxides	1.67
Carbon monoxide	1.69
Volatile organic compounds	0.25
Sulfur oxides as sulfur dioxide	0.027
Particulate matter	034
PM_{10}	0.34
$PM_{2.5}$	0.34
Toxic Air Pollutants	0.077
Hazardous Air Pollutants	0.000094
CO_2e	5,365

Pollutant	CAS Number	Pollutant Category	Potential Emissions (lbs/hr)	Potential Emissions (lb/yr)	1998 WAC 173-460 SQER (lbs/yr)	2019 WAC 173-460 SQER
Ammonia	7661-41-7	TAP B	0.016	139	17,500	37 lbs/24-hrs
Calcium Oxide (quicklime)	1305-78-8	TAP B	0.016	0.77	175	Not listed
Benzene	71-43-2	HAP/TAP A	0.000022	0.19	20	21 lb/yr
Formaldehyde	50-00-0	HAP/TAP A	0.00077	6.7	20	27 lb/yr
Hydrogen Sulfide	7783-07-5	TAP B	0.0053	13.8	175	0.15 lb/24-hrs

7. REGULATIONS AND EMISSION STANDARDS

Regulations 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 regulations, codes, or requirements listed below.

7.a Title 40 Code of Federal Regulations 60.40c et seq. (Subpart Dc) "Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units" establishes PM and SO_2 emission standards as well as recordkeeping and reporting requirements for each steam generating unit or unit that heats any heat transfer medium with a heat input greater than or equal to 10 MMBtu/hr but less than or equal to 100 MMBtu/hr for which construction, modification, or reconstruction is commenced after June 9, 1989. The Burnham Boiler has a heat input rating of 10.46 MMBtu/hr but was built in 1979 and has not undergone reconstruction to an extent that would trigger applicability of this regulation.

7.b 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.c 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.d 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.e 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.f 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.g 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.h SWCAA 400-040(2) "Fallout" states 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.i SWCAA 400-040(3) "Fugitive Emissions" requires that reasonable precautions be taken to prevent the fugitive release of air contaminants to the atmosphere.

7.j SWCAA 400-040(4) "Odors" requires any source which generates odors that may unreasonably interfere with any other property owner's use and enjoyment of their property to use recognized good practice and procedures to reduce these odors to a reasonable minimum.

7.k 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.l 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.m 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.

7.n SWCAA 400-113 "Requirements for New Sources in Attainment or Nonclassifiable Areas" requires that no approval to construct or alter an air contaminant source 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.

This facility is located in an area that is in attainment or nonclassifiable for each criteria air pollutant; therefore this regulation applies to this facility.

7.o SWCAA 400-114 " Requirements for Replacement or Substantial Alteration of Emission Control Technology at an Existing Stationary Source" requires that an Air Discharge Permit application be submitted to SWCAA for the change. Applications submitted in accordance with this section are reviewed in accordance with SWCAA 400-110. Replacement of the emission control equipment at this facility is subject to this regulation.

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

The proposed equipment and control systems have been evaluated to determine if they meet the requirements of Best Available Control Technology (BACT) and Best Available Control Technology for toxics (T-BACT) for the types and amounts of air contaminants emitted by the processes and equipment as described below:

New BACT Determinations

8.a Class A Biosolids Manufacturing Equipment. Based on inspections and observations at this facility, ammonia is the primary pollutant associated with this activity and little to no sulfurous odor has been observed. An oxidizing scrubber using sodium hydroxide and sodium hypochlorite to maintain a minimum oxidation reduction potential in the scrubbing liquor was initially installed to address odors from this process and Septage Receiving. This type of scrubber is well-suited to control sulfur compounds, and while sampling has indicated it also controls ammonia, it was unable to completely eliminate odors and at certain pH conditions has produced odorous chloramine compounds. The proposed dilute sulfuric acid scrubber is designed to address ammonia, and will eliminate the possibility of chloramine production. The proposed scrubber, operated in accordance with the manufacturer's recommendations, is expected to reduce ammonia emissions by 99% and would be the top choice for ammonia scrubbing in a top-down BACT analysis.

8.b Septage Receiving. The applicant has proposed replacing the practice of drawing air from the Septage Receiving Station to the oxidation scrubber with a carbon bed designed to remove H_2S. The proposed carbon bed would a top choice in a top-down BACT analysis to control odors, including H_2S, from septage handling.

Pre-existing BACT Determinations

8.c BACT Determination - Class A Biosolids Manufacturing Equipment. The Class A Biosolids Manufacturing equipment is a potential source of ammonia and odorous emissions. Ammonia and odorous emissions may be controlled with the use of a biofilter or a wet scrubbing system. The permittee has previously utilized a 300 cfm biofilter to control odorous emissions and ammonia but has elected to upgrade the system to a 2,400 cfm sodium hydroxide/sodium hypochlorite wet scrubbing system. The proposed wet scrubbing system will collect air from the septage receiving station as well as the Class A Biosolids Manufacturing Equipment. Odors from the septage receiving station had previously been controlled by partial enclosure and vertical venting of the drop-point. The proposed wet scrubbing system would be the top choice in a top-down BACT analysis for the control of the reduced sulfur compounds that are expected to make up a large portion of the potential odor from this facility, however it is not expected to provide significant control of potential ammonia emissions.

The height and velocity of the exhaust from the proposed scrubbing system will enable the impact of ammonia emissions to be maintained below the Acceptable Source Impact Level and odor threshold at the facility fenceline with an ammonia emission rate of 0.32 lb/hr and an emission concentration of 50 ppmv while providing a high level of control of other septage odors. The use of enclosure to provide for capture of emissions of odorous compounds emitted from the Class A Biosolids Manufacturing Equipment, treatment of the captured emissions with the proposed scrubbing system, and vertical venting of the exhaust gas above the roof line meets the requirements of BACT for this equipment.

8.d BACT Determination - Lime Storage Silo. The use of fabric filtration to control PM_{10} emissions from material handling to a discharge level of 0.005 gr/dscf or less meets the requirements of BACT for this facility. SWCAA believes this would be the top choice in a rigorous top-down BACT analysis for this application, therefore comparison of this control option with other (presumably less effective) control options was not required.

8.e BACT Determination – Burnham Boiler. The boiler is equipped with a low-NO_X burner package capable of maintaining average NO_X emissions at or below 30 ppmvd @ 3% O_2, and CO emissions at or below 50 ppmvd @ 3% O_2. These emission levels meet the requirements of BACT for this boiler and are consistent with BACT determinations for boilers of this size and age.

Other Determinations

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

8.g Compliance Assurance Monitoring (CAM). CAM is not applicable to any emission unit at this facility because this facility is not a major source required to obtain a Part 70 or 71 permit.

9. AMBIENT IMPACT ANALYSIS

Emissions of criteria air pollutants or precursors (nitrogen oxides, carbon monoxide, sulfur oxides, particulate matter, and volatile organic compounds) are all at or below 1.7 tons per year each. At these emission rates, no significant adverse ambient air quality impact is anticipated. Incremental increases in toxic air pollutant emissions will not exceed the applicable Small Quantity Emission Rates (SQER) listed in WAC 173-460 (as in effect August 21, 1998 or November 22, 2019); therefore, toxic impacts from these pollutants are presumed to be below regulatory significance.

Conclusions

9.a Operation of the septage receiving and processing equipment as proposed in ADP Application L-713 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 septage receiving and processing equipment proposed in ADP Application L-713, 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 septage receiving and processing equipment as proposed in ADP Application L-713 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 20-3440 in response to ADP Application L-713. Air Discharge Permit 20-3440 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.

Boiler. Nitrogen oxides emission concentrations were limited to the anticipated emission level provided by the burner manufacturer. Carbon monoxide emissions were limited to 50 parts per million even though the burner manufacturer anticipates emissions of only 12 parts per million. In SWCAA's experience, CO emissions can be kept to such levels, but sometimes only by increasing NO_X emissions. In order to balance NO_X and CO emissions and allow for reduced NO_X emissions, CO emissions of up to 50 ppm will be allowed. As discussed in Section 8, these emission levels represent BACT and are achievable with proper boiler maintenance. Annual NO_X and CO emissions were limited to levels corresponding to the short-term concentration limits.

Lime Storage Silo. Exhaust particulate matter concentrations were limited to 0.005 gr/dscf consistent with BACT. If the dust collector is operating properly, visible emission should not exceed 0% opacity for more than 3 minutes in any one-hour period, and this was made a condition of the permit.

Class A Biosolids Manufacturing Equipment. The ammonia emission limit was reduced from 50 ppmvd to 3 ppmvd because the new scrubber, unlike the scrubber it replaces, is specifically designed to control ammonia, and will easily achieve this level is operated properly.

10.c Operating Limits and Requirements. Only emissions from the combustion of natural gas were evaluated for the boiler, therefore operation of the boiler on any other fuel was prohibited. Because this facility handles septage with the potential to generate nuisance odors if handled improperly, the general requirement from SWCAA 400-040(4) to use good practices and procedures to minimize odor impacts was included as a permit condition.

Class A Biosolids Manufacturing Scrubber
For the Class A Biosolids Manufacturing Equipment Scrubber, a minimum scrubbing liquor recirculation rate, a minimum and maximum blowdown rate, and a maximum pH were established to assure the unit is operating in a manner sufficient to control ammonia emissions. The primary reaction to remove ammonia from the gas phase is:

$NH_3 + HSO_4^- \rightarrow NH_4^+ + SO_4^{2-}$

The bisulfate ion (HSO_4^-) is provided by sulfuric acid added to the scrubber sump.

$SO_4^{2-} + H_2SO_4 \rightarrow 2\ HSO_4^-$

The ratio of HSO_4^- to SO_4^{2-} can be calculated from the second disassociation constant (K_2) for sulfuric acid at any known pH (from which we can calculate $[H^+]$, $[H^+] = -10^{-pH}$):

$K_2 = [H^+][\ SO_4^{2-}]/[\ HSO_4^-]$

The net reaction is:

$2NH_3 + H_2SO_4 \rightarrow 2NH_4^+ + SO_4^{2-}$ (This is dissolved ammonium sulfate $(NH_4)_2SO_4$).

The scrubber was designed for a pH of 3.6, scrubber recirculation rate of 25 gallons per minute (gpm), and a blowdown of 3 gallons per hour (gph). If the pH is too high, not enough bisulfate (HSO_4^-) is available to react with the ammonia gas to produce a soluble ammonia ion. If the blowdown is too low, the resulting ammonium sulfate $(NH_4)_2SO_4$ will exceed the solubility limit (706 g/L at 0°C) and the solids will clog the scrubber. If the blowdown rate is too high, the bisulfate ion concentration will be too low to react all of the incoming ammonia. To allow for a reasonable amount of deviation from the design parameters, SWCAA assumed that pH could range as high as 3.8, and the recirculation rate could range as low as 20 gpm. SWCAA conservatively assumed that we would want to keep the ammonium sulfate concentration at no more than 75% of the solubility limit, and the excess bisulfate ion at no less than 100% excess. To stay within this range the blowdown must be maintained between 1.2 and 3.9 gph.

If the scrubber is started up without any ammonium sulfate in the scrubbing liquor, the pH will need to be temporarily lowered to compensate for the fact that the bisulfate concentration will be relatively low at a given pH. For example, if the scrubber was to start up with a pH of 3.6 and a blowdown rate of 3 gph, it could take 7 hours before there is enough recicrulcating bisulfate ion to scrub 250 ppm of ammonia at a pH of 3.6, and 8 hours before the pH could be raised to 3.8. Alternatively, if the pH were lowered to 3.0 the scrubber would be capable of scrubbing 250 ppm of ammonia within the first hour, and the pH could safely be raised to 3.8 within 4 hours.

Septage Receiving Station Carbon Bed

The primary odorous compound is expected to be H_2S. SWCAA has assumed a maximum average outlet concentration of 0.5 ppmvd based on the assumption that a well-designed and operated system can control 99% of H_2S, and maximum inlet H_2S will not exceed 50 ppm. If the operating limit of 0.5 ppm H_2S is reached, action must be taken (most likely media replacement) within 30 days. This should allow a reasonable balance between odor control and allowing enough time to schedule media replacement. Establishing an action level below 0.5 ppm is complicated by the fact that this concentration is at the lower end of detection for colorimetric detector tubes. To address the possibility that the bed could be exhausted without reaching the H_2S trigger, a backstop 10 year replacement schedule was added. Based on the size of the bed, it is unlikely that VOC emissions from the septage receiving could exhaust the bed in less than 10 years.

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). A monthly inspection of the Lime Storage Silo, Class A Biosolids manufacturing equipment, and Septage Receiving Station was deemed adequate to identify and prevent potential emission exceedances.

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

10.f Reporting. The permit requires reporting of the annual air emissions inventory, and reporting of the data necessary to develop the inventory (fuel consumption data, hours of Lime Storage Silo venting, hours of operation of the Class A Manufacturing Equipment, and emission test results). Upset conditions with the potential to cause excess emissions must be reported immediately in order to qualify for relief from monetary penalty in accordance with SWCAA 400-107. In addition, prompt reporting allows for accurate investigation into the cause of the event and prevention of similar future incidents.

11. STARTUP AND SHUTDOWN/ALTERNATIVE OPERATING SCENARIOS/POLLUTION PREVENTION

11.a Startup and Shutdown Provisions. Pursuant to SWCAA 400-081 "Startup 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 startup or shutdown. Where it is determined that a source is not capable of achieving continuous compliance with an emission standard during startup or shutdown, SWCAA shall include appropriate emission limitations, operating parameters, or other criteria to regulate performance of the source during startup 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 applicant 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 other than the control measures identified in the permit were identified by either the permittee or SWCAA. Therefore, no additional measures were included in the approval conditions.

12. EMISSION MONITORING AND TESTING

Performance monitoring of the boiler 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 boiler emissions will degrade rapidly enough that more frequent monitoring is necessary to prevent an exceedance of the permitted emission limits. In addition, more comprehensive source testing of the boiler was required initially and at least once every five years thereafter to provide a reasonable assurance of on-going compliance with the permitted emission limits.

Monthly monitoring of the ammonia concentration in the packed bed scrubber exhaust was required to assure that changes in feed materials or operation of the scrubber do not cause ammonia emissions to exceed the permitted emission limits. For the first year inlet ammonia concentration must also be measured to provide additional assurance that the scrubber is operating properly and capable of adequately controlling ammonia emissions. A colorimetric detector tube with a maximum range of 10 ppm would be preferred to the 30 ppm range specified in the monitoring requirement; however a review of ammonia detector tubes from several suppliers did not yield a tube with that range.

Scrubber exhaust flow must be measured coincident with testing of the Burnham Boiler to gather the information needed for emission inventory, dispersion modeling, and to assure that the blower is providing the appropriate airflow. This should be a relatively simply and cheap procedure to add on to a source emissions test of the Burnham Boiler.

13. FACILITY HISTORY

13.a General History. This facility began operation in approximately 1987 (this is the year the facility received approval by Lewis County). The Class A Biosolids Manufacturing Equipment was installed over a period of time beginning in approximately 2003.

13.b Regulatory History. The following approvals, Permits, and Orders have been issued for this facility:

Permit / Order #	Application #	Date Issued	Description
03-2479	L-516	9-22-03	Approval to install a 250 hp Burnham boiler.
07-2715	L-571	4-10-07	Approval to install Class A Biosolids Manufacturing equipment with biofilter for the control of odors, and installation of the Lime Storage Silo.
08-2805	L-605	9-15-2008	Approval to replace the Class A Biosolids Manufacturing equipment biofilter with a backed bed wet scrubber utilizing sodium hypochlorite and sodium hydroxide. The scrubber would also be used to treat air drawn from the Septage Receiving Station.

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 20-3440 becomes effective.

14. PUBLIC INVOLVEMENT

14.a Public Notice for Air Discharge Permit Application L-713. Public notice for Air Discharge Permit Application L-713 was published on the SWCAA internet website for a minimum of 15 days beginning on July 23, 2020.

14.b Public/Applicant Comment for Air Discharge Permit Application L-713. 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 (SEPA). This project is exempt from SEPA requirements pursuant to WAC 197-11-800(3) since it only involves repair, remodeling, maintenance, or minor alteration of existing structures, equipment or facilities, and does not involve material expansions or changes in use. SWCAA issued a determination that the project is exempt from SEPA review on November 12, 2020 (Determination of SEPA Exempt - SWCAA 20-040).