

Forms Package Air Permit Applications

Greater Vancouver Regional District
Air Quality Management Bylaw No. 1082, 2008



LIST OF FORMS

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[APPLICATION COMPLETENESS CHECKLIST](#)

Guidance is available at:

<http://www.metrovancouver.org/services/Permits-regulations-enforcement/air-quality/apply-permit/Pages/default.aspx>

Please only submit those forms you have completed starting with form MVAQ-A1

MVAQ-A1: BUSINESS INFORMATION AND PURPOSE OF APPLICATION

A1. Applicant Information <i>(Name of company seeking authorization, NOT the Agent)</i>		
*Company Legal Name <i>(as registered with the BC Registrar of Companies)</i> SEMIAHMOO RNG GP CORP.		
Company Doing Business As (DBA) Name <i>(if applicable)</i>		
*Incorporation Number <i>(as registered with the BC Registrar of Companies)</i> BC1416081		
*Legal Address <i>(as registered with BC Registrar of Companies - street address, city, province, postal code)</i> Suite 2500 Park Place, 666 Burrard Street, Vancouver, BC V6C 2X8		
Mailing Address <i>(if different from above)</i> Suite 650, 625 Howe Street, Vancouver, BC V6C 2T6		
Billing Address <i>(if different from above)</i> Suite 650, 625 Howe Street, Vancouver, BC V6C 2T6		
Contact Numbers	800 580 5641	778 229 4508 N/A
<i>*Phone (xxx-xxx-xxxx)</i>	<i>Mobile (xxx-xxx-xxxx)</i>	<i>Fax (xxx-xxx-xxxx)</i>
*Email Address semiahmoo@andionglobal.com		
*Results of Corporate Registry Search attached?		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>

A2. *Purpose <i>(e.g. to authorize the discharge of air contaminants from an anaerobic digester, to amend GVRD permit number GVA####)</i>	
<p>This application is for the discharge of air contaminants from an organic materials resource recovery facility. This facility will receive food waste and other organic feedstock that will be processed through an anaerobic digestion. Discharge points include: (1) biofilter that releases treated exhaust gases from inside the facility, (2) stack that releases gases from a biogas upgrading system, (3) stack that discharges gases from a natural gas hot water boiler, (4) stack from an emergency flare system; and (5) stack from an ammonia stripping tower.</p>	
Website for project information: https://www.andionglobal.com/public-notification-of-permit-application-semiahmoo-rng/	
*Authorization requested by date <i>(YYYY-MMM-DD)</i>	2023-06-29
*Authorization requested term <i>(in years)</i>	20

MVAQ-A1: BUSINESS INFORMATION AND PURPOSE OF APPLICATION

***Rationale for requested term**

Facility is expected to operate for more than 20 years.

***A3. Authorization Type (check all appropriate boxes)**

Permit

Approval

Amendment

Existing Permit or Approval number and expiry date (if applicable)

N/A

A4. Authorized Agent Information (complete only if you are an authorized agent for the applicant)

Agent's First Name, Last Name, and Title

Agent's Company Name

Agent's Doing Business As (DBA) Company Name (if applicable)

Address (street address, city, province, postal code)

Contact Numbers

Phone (xxx-xxx-xxxx)

Mobile (xxx-xxx-xxxx)

Fax (xxx-xxx-xxxx)

Agent's Email Address

A5. Applicant's Authorization for Agent (to be signed by an officer of the company)

I/we (applicant) hereby authorize _____ to deal with Metro Vancouver on all aspects of this application.

Applicant's Name

Applicant's Title

Signature of Applicant (not Agent or Representative)

Date (YYYY-MMM-DD)

(Sign this only if you are authorizing an agent or representative to act on your behalf.)

MVAQ-A1: BUSINESS INFORMATION AND PURPOSE OF APPLICATION

A6. Technical Contact for this Application <i>(Name of person to contact for this application, NOT the agent)</i>		
*Contact's First Name, Last Name, Title Daniele Chiodini, Chief Technology Officer		
*Contact's Company if different from Applicant Andion North America Ltd.		
Contact Numbers 778 229 4508	778 229 4508	N/A
<i>*Phone (xxx-xxx-xxxx)</i>	<i>Mobile (xxx-xxx-xxxx)</i>	<i>Fax (xxx-xxx-xxxx)</i>
*Email Address dchiodini@andion.ca		
Qualified Professional Declaration of Competency attached?		YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Qualified Professional Conflict of Interest Disclosure attached?		YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>

A7. Facility Location and Information			
*Facility type and description <i>(describe the primary type of business activity or operation at the facility)</i> The proposed anaerobic digestion facility will accept and treat discarded food waste and organic feedstocks for the purpose of being a treatment option for organic waste generated from Metro Vancouver and producing renewable natural gas and components for a soil amendment.			
*NAICS Code and description		562219 - Other Nonhazardous Waste Treatment and Disposal	
*Facility Latitude	49°00'32.72" N	*Facility Longitude	122°45'34.2" W
*Legal Land Description (Lot/Block/Plan) OR PID/PIN/Crown File No. Portions of Lot 10 Township 1 NWD Section 1 & 2, Semiahmoo, BC			
*Facility Address (civic address e.g., 4321 Kingsway, Burnaby BC V5J 4G8) 16535 & 16565 Beach Road, Semiahmoo First Nation (Surrey), BC V3S 9R6			
*Facility Operator/Site Contact First Name, Last Name and Title Daniele Chiodini, Chief Technology Officer, Andion North America Ltd.			
Facility Operator/Site Contact Numbers 778 229 4508		778 229 4508 N/A	
<i>*Phone (xxx-xxx-xxxx)</i>	<i>Mobile (xxx-xxx-xxxx)</i>	<i>Fax (xxx-xxx-xxxx)</i>	
*Facility Operator/Site Contact Email Address dchiodini@andion.ca			

A8. How near are sensitive receptors?			
	Name or address:	Distance from legal facility property line:	
*Nearest business/residence	16505 Upper Beach Road, Surrey, BC V3S 9R6	330	metres
*Nearest sensitive receptor	Douglas Elementary 17325 2 Ave, Surrey, BC V3S 9P9	1,200	metres
*Nearest major roads	BC Highway 99/King George Blvd, Surrey	40	metres

MVAQ-A1: BUSINESS INFORMATION AND PURPOSE OF APPLICATION

(If available, attach a Google or Bing map showing location of sensitive receptors)

MVAQ-A1: BUSINESS INFORMATION AND PURPOSE OF APPLICATION

A9. Other Requirements		
* Is the Applicant the Legal Land Owner?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
* If the Applicant is not the Legal Land Owner, is the Legal Land Owner aware of the proposed discharge?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
* Land Title documentation is required if the application is for a new permit or approval or if the application is for an amendment where sales or acquisitions of property have taken place since the last land title documentation was provided. Is land title documentation attached?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
<p><i>If NO, indicate why</i> The facility will be situated on Semiahmoo First Nation Land (Federal land). The land lease area has been surveyed and is awaiting a parcel identifier which will be assigned by Natural Resource Canada. This will serve as the land title documentation.</p>		
* Are the changes to your facility classified as a “prescribed reviewable project” pursuant to the Environmental Assessment Act Reviewable Projects Regulation ?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>

*A10. Signature	
	2023-Jun-29

Signature of Applicant (or Agent if applicable)

Date (YYYY-MMM-DD)

MVAQ-B1: PROCESS DESCRIPTION & SCHEMATIC FLOW DIAGRAM

You must attach the following to your application:

- (1) a written description of the processes at your facility, including the raw materials used and products and residuals produced, emphasizing the processes that discharge air contaminants to atmosphere and their associated control systems,
- (2) a schematic flow diagram with clear links to the process description,
- (3) material safety data sheets (SDS) for all raw materials and products that are relevant to potential air emissions (i.e. gases, liquids with volatile components, and solids that could result in dust), and
- (4) schematic drawings and specifications for emission control equipment.

See Section B in [Guidance for Air Permit Applications](#) for more details.

MVAQ-C1: SITE PLAN

Attach a site plan to the application – refer to Section C in the [Guidance for Air Permit Applications](#) for details.

MVAQ-D1: EMISSION SOURCE SUMMARY

Summarize the requested annual emission quantity limits, in tonnes per year (t/y), for ALL (new, existing, modified or obsolete) emission sources (point or fugitive) in this table or an Excel spreadsheet. We will use this information to ensure we authorize all emission sources and remove any obsolete emission sources from an existing permit or approval. If you have an existing permit, also attach form MVAQ-D1a. For each new or modified source, attach a completed MVAQ-D2 for point sources or MVAQ-D3 for fugitive emission sources (e.g., vents, stockpiles, transfer points, ship loading). Transfer facility total quantities in this table to the appropriate Notice of Application (MVAQ-E1, -E2 or -E3).

* Emission Source ES #	*EMISSION SOURCE DESCRIPTION	Nitrogen Oxides (NO _x) t/y	Sulphur Dioxide (SO ₂) t/y	Volatile Organic Compounds (VOC) t/y	Total Particulate Matter (TPM) t/y	Other (identify contaminants)			* New, Existing, Modified, or Obsolete
						Ammonia (NH ₃) t/y	Methane (CH ₄) t/y	Hydrogen Sulphide (H ₂ S) t/y	
ES-01	Reception/pre-treatment building exhaust, biopulper/ equalization tank headspace discharging through a biofilter			0.78		0.07		0.10	New
ES-02	Biogas Upgrading Facility discharging through a stack						28.24	6.00E-03	New
ES-03	Gas Fired Hot Water Boiler discharging through a stack	1.43							New
ES-04	Emergency Flare System discharging through a stack	1.36	0.523	4.51E-03			7.56	3.52E-03	New

MVAQ-D1: EMISSION SOURCE SUMMARY

*Emission Source ES #	*EMISSION SOURCE DESCRIPTION	Nitrogen Oxides (NO _x) t/y	Sulphur Dioxide (SO ₂) t/y	Volatile Organic Compounds (VOC) t/y	Total Particulate Matter (TPM) t/y	Other (identify contaminants)			*New, Existing, Modified, or Obsolete
						Ammonia (NH ₃) t/y	Methane (CH ₄) t/y	Hydrogen Sulphide (H ₂ S) t/y	
ES-05	Ammonia Stripper discharging through a stack					0.34			New
	*FACILITY TOTAL REQUESTED AUTHORIZED EMISSION QUANTITY	2.789	0.523	0.781	0.000	0.406	35.80	0.108	
N/A	FACILITY TOTAL CURRENTLY AUTHORIZED EMISSION QUANTITY (* if applicable)	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

For amendments, or applications related to expiring permits, compare your currently authorized with your requested emission quantity limits and provide reasons for any changes (whether they are increasing or decreasing). We strongly recommend that you confirm your current limits with us, and in particular, those related to combustion sources. Attach additional pages as necessary or delete unused rows. Sum total facility quantities for each air contaminant on Form MVAQ-D1.

*Existing emission source # and name	*Air contaminant (name)	*Current emission quantity limit, t/y	*Requested emission quantity limit, t/y	*Change, t/y	*Reason(s) for change

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

*Existing emission source # and name	*Air contaminant (name)	*Current emission quantity limit, t/y	*Requested emission quantity limit, t/y	*Change, t/y	*Reason(s) for change

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

*D2-1a EMISSION SOURCE (ES) NUMBER	ES-01	*D2-1b DESCRIPTION	Reception/pre-treatment building exhaust, biopulper/equalization tank headspace discharging through a biofilter
*D2-1c EMISSION POINT TYPE			Stack <input type="checkbox"/> Vent <input type="checkbox"/> Transfer Point <input type="checkbox"/> Other <input checked="" type="checkbox"/>
			New <input checked="" type="checkbox"/> Modified <input type="checkbox"/>

EMISSION SOURCE CHARACTERISTICS						
*D2-1d Stack height (m from ground level)	*D2-1d Stack inside diameter at stack top (m)	*D2-1d Stack Design (check all that apply)	Non-circular <input checked="" type="checkbox"/> If non-circular, provide effective diameter (m)		25m	
			Horizontal <input checked="" type="checkbox"/> Vertical Up <input type="checkbox"/> Vertical Down <input type="checkbox"/>			
			At angle <input type="checkbox"/> If at angle, provide degrees from horizontal			
			Raincap? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>			
*D2-1e Minimum exhaust gas temp (°C)	*D2-1e Normal exhaust gas temp (°C)	*D2-1e Maximum exhaust gas flowrate (Sm³/min)¹	*D2-1e Exit velocity at actual conditions (m/s)	*D2-1e Maximum opacity (%)	*D2-1f Maximum operating hours per year	
10	20	1,167	0.04	N/A	8760	
*D2-1g(i) Are you requesting a restriction to specific days of the week or hours of the day that you operate? If yes please explain under D2-1i Comments					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1g(ii) If requested maximum operating hours less than 8760 h/y, how will facility track hours?						
*D2-1h Is there potential for odour beyond the facility property line from this source?					YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
Odour management plan attached?					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
*D2-1h Is there potential for dust beyond the facility property line from this source?					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Dust management plan attached?					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1i Comments						
<p>Effective diameter as calculated by $\sqrt{19 \times 26.1^4 / \pi} = 25\text{m}$</p> <p>Biofilter dimensions (m)</p> <p>(19 x 26.1 x 2)</p>						

¹ Standard conditions are: 101.325 kPa, 20°C, zero percent moisture and 3% oxygen for gaseous or liquid fuels or 8% oxygen for wood fuel.

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

EMISSION SOURCE CHARACTERISTICS

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MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

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***D2-1a EMISSION SOURCE NUMBER (ES)**

ES-01

EMISSIONS COLLECTION AND CONTROLS			
*D2-2a Description of how emissions are collected and directed to control works		*D2-2a Collection Efficiency (%)	
Emissions are collected through a series of sealed ducts maintained at a slight negative pressure		100%	
*D2-2b Description of control works (equipment or procedures)			
[REDACTED]			
*D2-2c Manufacturer and Model Name and/or Number		*D2-2c Control Efficiency (%)	
Scrubbers: Tecnoplast USA LLC (or equivalent) Biofilter: Andion design		95	
*D2-2d Best Available Control Technology?	Most effective or advanced control technology currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Most effective or advanced management practice currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Older control technology or management practice?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	Separate document attached providing rationale for emission controls selected and alternatives considered	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-2e Comments			

PROCESS(ES) OR EQUIPMENT GENERATING THE EMISSIONS	
*D2-3a Process or equipment description	
Odours from bulk food waste delivery and pre-treatment buildings; headspace odours from the Biopulper (upstream anaerobic digester equalization tank) and the final dewatering equalization tank.	
*D2-3b Manufacturer and Model name and/or Number	
Andion design	
*D2-3c Maximum throughput or process capacity for non-combustion processes (include units)	125,000 tonnes food waste per year

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

*D2-1a EMISSION SOURCE NUMBER (ES)						ES-01
*D2-3d Combustion sources (if applicable)	*D2-3d Fuel type	*D2-3d Max input firing rate (GJ/h)	*D2-3d Primary or standby fuel?	*D2-3d Source if waste based	*D2-3d % Sulphur content	*D2-3d Max firing hours per year
D2-3e Comments						

AIR CONTAMINANTS TO BE DISCHARGED			
*D2-4a Air Contaminant Common Name <i>(other than products of natural gas combustion – see guidance)</i>	D2-4a CAS <i>(see guidance)</i>	*D2-4b Requested outlet concentration limit under standard conditions (mg/Sm ³)	*D2-4c Requested emission quantity limit (provide sample calculations) (t/y)
Ammonia (NH ₃)	7664-41-7	0.11	0.07
Hydrogen Sulphide (H ₂ S)	7783-06-4	0.16	0.10
Total Volatile Organic Carbon (TVOC)	*	1.267	0.78
D2-4d Comments Max Discharge NH₃ = 1167 m³/h x 60 min/h x 8760 h/y x 0.11 mg/m³ x 1 tonne/10⁹ mg) = 0.07 tonne/y Max Discharge H₂S = 1167 m³/h x 60 min/h x 8760 h/y x 0.16 mg/m³ x 1 tonne/10⁹ mg) = 0.10 tonne/y Max Discharge TVOC = 1167 m³/h x 60 min/h x 8760 h/y x 1.267 mg/m³ x 1 tonne/10⁹ mg) = 0.78 tonne/y			

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

*D2-1a EMISSION SOURCE (ES) NUMBER	ES-02	*D2-1b DESCRIPTION	Biogas Upgrading Facility discharging through a stack
*D2-1c EMISSION POINT TYPE			Stack <input checked="" type="checkbox"/> Vent <input type="checkbox"/> Transfer Point <input type="checkbox"/> Other <input type="checkbox"/>
			New <input checked="" type="checkbox"/> Modified <input type="checkbox"/>

EMISSION SOURCE CHARACTERISTICS						
*D2-1d Stack height (m from ground level)	*D2-1d Stack inside diameter at stack top (m)	*D2-1d Stack Design (check all that apply)	Non-circular <input type="checkbox"/> If non-circular, provide effective diameter (m)			
			Horizontal <input type="checkbox"/> Vertical Up <input type="checkbox"/> Vertical Down <input checked="" type="checkbox"/>			
			At angle <input checked="" type="checkbox"/> If at angle, provide degrees from horizontal			
			Raincap? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>			
*D2-1e Minimum exhaust gas temp (°C)	*D2-1e Normal exhaust gas temp (°C)	*D2-1e Maximum exhaust gas flowrate (Sm³/min)²	*D2-1e Exit velocity at actual conditions (m/s)	*D2-1e Maximum opacity (%)	*D2-1f Maximum operating hours per year	
8	108	6.73	16.75	5%	8760	
*D2-1g(i) Are you requesting a restriction to specific days of the week or hours of the day that you operate? If yes please explain under D2-1i Comments					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1g(ii) If requested maximum operating hours less than 8760 h/y, how will facility track hours?						
*D2-1h Is there potential for odour beyond the facility property line from this source?					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Odour management plan attached?					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
*D2-1h Is there potential for dust beyond the facility property line from this source?					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Dust management plan attached?					YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1i Comments						
<p>The emission gas is produced after CO₂, H₂O and other trace compounds are separated from biogas generated under anaerobic digestion. This process yields a relatively pure biomethane stream (>98 v% CH₄) as well as a stream which is high in CO₂. The biomethane is directed to FortisBC and the CO₂ stream forms the emission source. Since the emission is not a combustion product, no opacity is expected and the maximum exhaust value given is provided at standard temperature and pressure (20 °C, 101.325 kPa), as well as normalized to 0% H₂O, and the O₂ content at the modelled value of 0.2%.</p>						

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² Standard conditions are: 101.325 kPa, 20°C, zero percent moisture and 3% oxygen for gaseous or liquid fuels or 8% oxygen for wood fuel.

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

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*D2-1a EMISSION SOURCE NUMBER (ES)

ES-02

EMISSIONS COLLECTION AND CONTROLS			
*D2-2a Description of how emissions are collected and directed to control works		*D2-2a Collection Efficiency (%)	
Biogas upgrading exhaust is sent directly a stack without interconnecting ductwork		100%	
*D2-2b Description of control works (equipment or procedures)			
Inline gas composition analyzers and automated control of process conditions (e.g. column pressure and retention time) ensures that CH ₄ capture in the upgrader meets a minimum standard. If the system fails, the gas will be sent to the emergency flare (ES05). This ensures exhaust quality meets a minimum standard and exhaust from the biogas upgrading system is not subject to any downstream control.			
*D2-2c Manufacturer and Model Name and/or Number		*D2-2c Control Efficiency (%)	
Xebec BGX-1000 or equivalent in performance		0	
*D2-2d Best Available Control Technology?	Most effective or advanced control technology currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Most effective or advanced management practice currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Older control technology or management practice?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	Separate document attached providing rationale for emission controls selected and alternatives considered	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-2e Comments			

PROCESS(ES) OR EQUIPMENT GENERATING THE EMISSIONS	
*D2-3a Process or equipment description	
The biogas cleaning (washing) and upgrading system purifies the biogas stream to produce high quality biomethane by removing H ₂ S, water soluble VOCs, and CO ₂ . H ₂ S and VOCs are removed through water scrubbing and adsorption to media (e.g. activated carbon). Spent water is treated and re-used onsite and spent adsorption media is replaced and disposed offsite. Neither present an air emission source. CO ₂ is proposed to be removed by pressure swing adsorption (PSA) or Membrane system. In this process CO ₂ , as well as some N ₂ and O ₂ , is adsorbed to media in an adsorption column operating under high pressure. A concentrated biomethane stream is discharged from the column for delivery to FortisBC. The CO ₂ , N ₂ and O ₂ is de-adsorbed from the media by applying a slight vacuum and the adsorbed gases are vented from the column. Since H ₂ S and VOCs are primarily removed through processes that do not result in air emissions, the PSA/Membrane exhaust stream is primarily CO ₂ , N ₂ , and O ₂ with small amounts of CH ₄ .	
*D2-3b Manufacturer and Model name and/or Number	
Xebec BGX-1000 or equivalent in performance	
*D2-3c Maximum throughput or process capacity for non-combustion processes (include units)	1,050 Nm ³ /h of biogas

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

*D2-1a EMISSION SOURCE NUMBER (ES)						ES-02
*D2-3d Combustion sources (if applicable)	*D2-3d Fuel type	*D2-3d Max input firing rate (GJ/h)	*D2-3d Primary or standby fuel?	*D2-3d Source if waste based	*D2-3d % Sulphur content	*D2-3d Max firing hours per year
D2-3e Comments						

AIR CONTAMINANTS TO BE DISCHARGED			
*D2-4a Air Contaminant Common Name <i>(other than products of natural gas combustion – see guidance)</i>	D2-4a CAS <i>(see guidance)</i>	*D2-4b Requested outlet concentration limit under standard conditions (mg/Sm ³)	*D2-4c Requested emission quantity limit (provide sample calculations) (t/y)
Methane (CH ₄)	74-82-8	1.2vol-% (7,982 mg/m ³)	28.24 t/y
Hydrogen Sulphide (H ₂ S)	7783-06-4	1.2 ppm (1.7 mg/m ³)	6.0x10 ⁻³ t/y
D2-4d Comments			
Concentrations are provided at P=101.325 kPa, T= 20 °C, 0% H ₂ O and 0.4% O ₂ as per previous notes.			
Maximum Discharge Rate = Flow x Concentration			
Max Discharge CH ₄ = 6.73 m ³ /min x 60 min/h x 8760 h/y x 7,982 mg/m ³ x 1 tonne/10 ⁹ mg = 28.24 tonne/y			
Max Discharge H ₂ S = 6.73 m ³ /min x 60 min/h x 8760 h/y x 1.7 mg/m ³ x 1 tonne/10 ⁹ mg = 6.0x10 ⁻³ tonne/y			

MVAQ-D1a: EXISTING PERMIT - EMISSION SOURCE COMPARISON

*D2-1a EMISSION SOURCE (ES) NUMBER	ES-03	*D2-1b DESCRIPTION	Hot Water boiler discharging through stack
*D2-1c EMISSION POINT TYPE		Stack <input checked="" type="checkbox"/> Vent <input type="checkbox"/> Transfer Point <input type="checkbox"/> Other <input type="checkbox"/>	
		New <input checked="" type="checkbox"/> Modified <input type="checkbox"/>	

EMISSION SOURCE CHARACTERISTICS					
*D2-1d Stack height (m from ground level)	*D2-1d Stack inside diameter at stack top (m)	*D2-1d Stack Design (check all that apply)	Non-circular <input type="checkbox"/> If non-circular, provide effective diameter (m)		
			Horizontal <input type="checkbox"/>	Vertical Up <input checked="" type="checkbox"/>	Vertical Down <input type="checkbox"/>
			At angle <input type="checkbox"/> If at angle, provide degrees from horizontal		
6.1	0.48		Raincap? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>		
*D2-1e Minimum exhaust gas temp (°C)	*D2-1e Normal exhaust gas temp (°C)	*D2-1e Maximum exhaust gas flowrate (Sm³/min)³	*D2-1e Exit velocity at actual conditions (m/s)	*D2-1e Maximum opacity (%)	*D2-1f Maximum operating hours per year
63.9	63.9	52.53	5.7	5%	6570
*D2-1g(i) Are you requesting a restriction to specific days of the week or hours of the day that you operate? If yes please explain under D2-1i Comments				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1g(ii) If requested maximum operating hours less than 8760 h/y, how will facility track hours?			Times of boiler operation will be tracked in the system's programmable logic controller (PLC)		
*D2-1h Is there potential for odour beyond the facility property line from this source?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Odour management plan attached?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
*D2-1h Is there potential for dust beyond the facility property line from this source?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Dust management plan attached?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1i Comments					

Continued on next page.....

³ Standard conditions are: 101.325 kPa, 20°C, zero percent moisture and 3% oxygen for gaseous or liquid fuels or 8% oxygen for wood fuel.

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

.....Continued from previous page

*D2-1a EMISSION SOURCE NUMBER (ES)	ES-03
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EMISSIONS COLLECTION AND CONTROLS			
*D2-2a Description of how emissions are collected and directed to control works		*D2-2a Collection Efficiency (%)	
Combustion products generated in the burner are exhausted directly to a stack without any interconnecting ductwork		100%	
*D2-2b Description of control works (equipment or procedures)			
Proper air and natural gas flow ratios to the burner are automatically controlled with flow meters and a programmable logistics controller (PLC). This ensures combustion is complete, no incomplete combustion products (particulate matter or carbon monoxide) are produced and exhaust from the biogas upgrading system does not need to be subject to any downstream control.			
*D2-2c Manufacturer and Model Name and/or Number		*D2-2c Control Efficiency (%)	
Gasmaster GMI-8M or equivalent in performance		0	
*D2-2d Best Available Control Technology?	Most effective or advanced control technology currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Most effective or advanced management practice currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Older control technology or management practice?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	Separate document attached providing rationale for emission controls selected and alternatives considered	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-2e Comments			

PROCESS(ES) OR EQUIPMENT GENERATING THE EMISSIONS	
*D2-3a Process or equipment description	
Hot Water Boiler with Low NOx burner emissions	
*D2-3b Manufacturer and Model name and/or Number	
Gasmaster GMI-8M Low NOx or equivalent in performances	
*D2-3c Maximum throughput or process capacity for non-combustion processes (include units)	N/A

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

		*D2-1a EMISSION SOURCE NUMBER (ES)				ES-03
*D2-3d Combustion sources (if applicable)	*D2-3d Fuel type	*D2-3d Max input firing rate (GJ/h)	*D2-3d Primary or standby fuel?	*D2-3d Source if waste based	*D2-3d % Sulphur content	*D2-3d Max firing hours per year
	Natural Gas	8.44	Primary	N/A	15.6 mg/m3	6570
D2-3e Comments						

AIR CONTAMINANTS TO BE DISCHARGED			
*D2-4a Air Contaminant Common Name (other than products of natural gas combustion – see guidance)	D2-4a CAS (see guidance)	*D2-4b Requested outlet concentration limit under standard conditions (mg/Sm ³)	*D2-4c Requested emission quantity limit (provide sample calculations) (t/y)
Products of natural gas combustion	N/A	N/A	N/A
Oxides of Nitrogen, expressed as NO ₂ (NO _x)	10102-44-0	68.861	1.427
D2-4d Comments			
<p>Per the guidance document, products of natural gas combustion are not individually listed. NOx emissions calculated as NO2</p> <p>Calculation: 52.53 Nm3/min X (60min/h) X (6570h/y) X 68.861 mg NO2/m3 X (1 tonne/10⁹ mg) = 1.427 tonnes/y</p>			

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

*D2-1a EMISSION SOURCE (ES) NUMBER	ES-04	*D2-1b DESCRIPTION	Emergency Flare System discharging through a stack
*D2-1c EMISSION POINT TYPE			Stack <input checked="" type="checkbox"/> Vent <input type="checkbox"/> Transfer Point <input type="checkbox"/> Other <input type="checkbox"/>
			New <input checked="" type="checkbox"/> Modified <input type="checkbox"/>

EMISSION SOURCE CHARACTERISTICS					
*D2-1d Stack height (m from ground level)	*D2-1d Stack inside diameter at stack top (m)	*D2-1d Stack Design (check all that apply)	Non-circular <input type="checkbox"/> If non-circular, provide effective diameter (m)		
			Horizontal <input type="checkbox"/> Vertical Up <input checked="" type="checkbox"/> Vertical Down <input type="checkbox"/>		
			At angle <input type="checkbox"/> If at angle, provide degrees from horizontal		
			Raincap? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>		
*D2-1e Minimum exhaust gas temp (°C)	*D2-1e Normal exhaust gas temp (°C)	*D2-1e Maximum exhaust gas flowrate (Sm³/min)⁴	*D2-1e Exit velocity at actual conditions (m/s)	*D2-1e Maximum opacity (%)	*D2-1f Maximum operating hours per year
760	760	137.71	10.75	5%	900
*D2-1g(i) Are you requesting a restriction to specific days of the week or hours of the day that you operate? If yes please explain under D2-1i Comments				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1g(ii) If requested maximum operating hours less than 8760 h/y, how will facility track hours?			On/Off operation of the flare will be tracked as a tagged value in the system PLC.		
*D2-1h Is there potential for odour beyond the facility property line from this source?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Odour management plan attached?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
*D2-1h Is there potential for dust beyond the facility property line from this source?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Dust management plan attached?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1i Comments					
After corrections for temperature, moisture, and oxygen content, maximum exhaust flow at standard conditions is substantially less than flow at actual conditions (1463 m ³ /min). O ₂ content has been adjusted down to 3% (from 14%), by removing a portion of the O ₂ from the mass balance.					

Continued on next page.....

⁴ Standard conditions are: 101.325 kPa, 20°C, zero percent moisture and 3% oxygen for gaseous or liquid fuels or 8% oxygen for wood fuel.

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

.....Continued from previous page

*D2-1a EMISSION SOURCE NUMBER (ES)	ES-04
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EMISSIONS COLLECTION AND CONTROLS			
*D2-2a Description of how emissions are collected and directed to control works		*D2-2a Collection Efficiency (%)	
Combustion products generated in the burner are exhausted directly to a stack without any interconnecting ductwork		100%	
*D2-2b Description of control works (equipment or procedures)			
<div style="background-color: #cccccc; height: 20px; width: 100%;"></div> <p style="text-align: center;">This ensures complete combustion of the gas, even as CH₄ content varies, and minimizes incomplete combustion products (particulate matter and carbon monoxide). The flare is equipped with an auto igniter.</p>			
*D2-2c Manufacturer and Model Name and/or Number		*D2-2c Control Efficiency (%)	
Zeeco, Inc VCU 6-40-FG or Equivalent Performance		98%	
*D2-2d Best Available Control Technology?	Most effective or advanced control technology currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Most effective or advanced management practice currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Older control technology or management practice?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	Separate document attached providing rationale for emission controls selected and alternatives considered	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-2e Comments			

PROCESS(ES) OR EQUIPMENT GENERATING THE EMISSIONS	
*D2-3a Process or equipment description	
<p>Enclosed vapour combustor, where the flame is near grade level and enclosed in an insulated combustion chamber. Major equipment components included in the system are the stack, anti-flash back burners, an automatic ignition system, blowers, shut down valve and controls, and a flame arrestor. The system flares with no visible flame and automated control of combustion air allows a combustion temperature of 1,000°C or more.</p>	
*D2-3b Manufacturer and Model name and/or Number	
Zeeco, Inc VCU 6-40-FG or Equivalent Performance	
*D2-3c Maximum throughput or process capacity for non-combustion processes (include units)	

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

*D2-1a EMISSION SOURCE NUMBER (ES)						ES-04	
*D2-3d Combustion sources (if applicable)	*D2-3d Fuel type	*D2-3d Max input firing rate (GJ/h)	*D2-3d Primary or standby fuel?	*D2-3d Source if waste based	*D2-3d % Sulphur content	*D2-3d Max firing hours per year	
D2-3e Comments							

AIR CONTAMINANTS TO BE DISCHARGED			
*D2-4a Air Contaminant Common Name (other than products of natural gas combustion – see guidance)	D2-4a CAS (see guidance)	*D2-4b Requested outlet concentration limit under standard conditions (mg/Sm ³)	*D2-4c Requested emission quantity limit (provide sample calculations) (t/y)
Sulphur Dioxide (SO ₂)	7446-09-5	70.07	0.523
Oxides of Nitrogen, expressed as NO ₂ (NO _x)	11104-93-1	182.75	1.36
Methane (CH ₄)	74-82-8	1014.28	7.56
Hydrogen Sulphide (H ₂ S)	7783-06-4	0.47	3.52 x 10 ⁻³
Total Volatile Organic Carbon (TVOC)	*	0.606	4.508 x 10 ⁻³
<p>D2-4d Comments</p> <p>Predicted emission compounds and concentrations were obtained using modelled data provided by the equipment vendor.</p> <p>Maximum discharge was calculated using an assume feed rate of 1,050 Nm³/h of biogas and 900 hours per year of maximum operation. 98% of the biogas is assumed to be combusted and 2% leaves the stack as uncombusted biogas.</p>			

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

*D2-1a EMISSION SOURCE (ES) NUMBER	ES-05	*D2-1b DESCRIPTION	Ammonia Stripper discharging through a stack
*D2-1c EMISSION POINT TYPE		Stack <input checked="" type="checkbox"/> Vent <input type="checkbox"/> Transfer Point <input type="checkbox"/> Other <input type="checkbox"/>	
		New <input checked="" type="checkbox"/> Modified <input type="checkbox"/>	

EMISSION SOURCE CHARACTERISTICS					
*D2-1d Stack height (m from ground level)	*D2-1d Stack inside diameter at stack top (m)	*D2-1d Stack Design (check all that apply)	Non-circular <input type="checkbox"/> If non-circular, provide effective diameter (m)		
			Horizontal <input type="checkbox"/> Vertical Up <input checked="" type="checkbox"/> Vertical Down <input type="checkbox"/>		
			At angle <input type="checkbox"/> If at angle, provide degrees from horizontal		
			Raincap? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>		
*D2-1e Minimum exhaust gas temp (°C)	*D2-1e Normal exhaust gas temp (°C)	*D2-1e Maximum exhaust gas flowrate (Sm³/min)⁵	*D2-1e Exit velocity at actual conditions (m/s)	*D2-1e Maximum opacity (%)	*D2-1f Maximum operating hours per year
65	65	161	14.7	5	8760
*D2-1g(i) Are you requesting a restriction to specific days of the week or hours of the day that you operate? <i>If yes please explain under D2-1i Comments</i>				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1g(ii) If requested maximum operating hours less than 8760 h/y, how will facility track hours?					
*D2-1h Is there potential for odour beyond the facility property line from this source?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Odour management plan attached?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
*D2-1h Is there potential for dust beyond the facility property line from this source?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
Dust management plan attached?				YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-1i Comments					
<p>Since the emission is not a combustion product, opacity is not expected and the maximum exhaust value given is provided at standard temperature and pressure (20°C, 101.325 kPa), as well as normalized to 0% H₂O, but the dry air O₂ content remains at the modelled value of 20.9%.</p>					

Continued on next page.....

⁵ Standard conditions are: 101.325 kPa, 20°C, zero percent moisture and 3% oxygen for gaseous or liquid fuels or 8% oxygen for wood fuel.

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

.....Continued from previous page

*D2-1a EMISSION SOURCE NUMBER (ES)	ES-05
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EMISSIONS COLLECTION AND CONTROLS			
*D2-2a Description of how emissions are collected and directed to control works		*D2-2a Collection Efficiency (%)	
Ammonia rich gas generated in the ammonia stripping tanks is directed through sealed ductwork to the ammonia adsorption columns. In the adsorption columns, ammonia gas is transferred to the liquid phase eliminating the possibility of downstream air release of ammonia. The entire system is contained and not open to atmosphere.		100%	
*D2-2b Description of control works (equipment or procedures)			
[REDACTED]			
*D2-2c Manufacturer and Model Name and/or Number		*D2-2c Control Efficiency (%)	
This is an Adion design using Endress + Hauser instrumentation for control.		99%	
*D2-2d Best Available Control Technology?	Most effective or advanced control technology currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Most effective or advanced management practice currently successfully in use elsewhere?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
	Older control technology or management practice?	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
	Separate document attached providing rationale for emission controls selected and alternatives considered	YES <input type="checkbox"/>	NO <input checked="" type="checkbox"/>
D2-2e Comments			
All scrubbers for ammonia abatement normally use this type of control.			

PROCESS(ES) OR EQUIPMENT GENERATING THE EMISSIONS	
*D2-3a Process or equipment description	
The digestate leaving the AD is high in ammoniacal nitrogen. Ammoniacal nitrogen exists both in the form of dissolved ammonia gas (NH ₃) and in solution as an ammonium ion (NH ⁺). These two species are present in a dynamic equilibrium. The digestate is treated in	
[REDACTED]	
[REDACTED]	

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

PROCESS(ES) OR EQUIPMENT GENERATING THE EMISSIONS	
solution will discharged to a dedicated tank and periodically emptied for disposal or sale (as inorganic fertilizer) to third-party users, depending on commercial demand.	
*D2-3b Manufacturer and Model name and/or Number	
Andion NHFREE	
*D2-3c Maximum throughput or process capacity for non-combustion processes (include units)	300 tonnes/d of ammonia rich digestate

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

*D2-1a EMISSION SOURCE NUMBER (ES)						ES-05	
*D2-3d Combustion sources (if applicable)	*D2-3d Fuel type	*D2-3d Max input firing rate (GJ/h)	*D2-3d Primary or standby fuel?	*D2-3d Source if waste based	*D2-3d % Sulphur content	*D2-3d Max firing hours per year	
D2-3e Comments							

AIR CONTAMINANTS TO BE DISCHARGED			
*D2-4a Air Contaminant Common Name <i>(other than products of natural gas combustion – see guidance)</i>	D2-4a CAS <i>(see guidance)</i>	*D2-4b Requested outlet concentration limit under standard conditions (mg/Sm ³)	*D2-4c Requested emission quantity limit (provide sample calculations) (t/y)
Ammonia	7664-41-7	4.0	0.34
D2-4d Comments			
<p>Air flow of 161 Nm³/min at 8760 hours of per year and concentration 4 mg NH₃/m³</p> <p>Calculation: 161 Nm³/min X (60min/h) X (8760h/y) X 4 mg NH₃/m³ X (1 tonne/10⁹ mg) = 0.34 tonne/y</p>			

MVAQ-D2: EMISSION INFORMATION FOR POINT SOURCES

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MVAQ-D3: EMISSION INFORMATION FOR FUGITIVE SOURCES

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MVAQ-D4: AIR QUALITY DISPERSION MODELLING

Metro Vancouver will likely request air quality dispersion modelling if

- an application requires public notification,
- if the change in the annual emission fee based on requested emissions is greater than \$1,000,
- if we've received recent complaints about the facility, or
- if the discharge is near sensitive receptors (residences, schools, hospitals, health care facilities, homes for the elderly, etc.).

There may be other instances when MV or local health authorities (Vancouver Coastal Health or Fraser Health) request dispersion modelling.

A dispersion model plan should be submitted for approval prior to running any model.

If you are conducting air quality dispersion modelling, please review [Guidance for Air Permit Applications](#) for more information. Contact Metro Vancouver for additional guidance, if required.

You must conduct modelling according to the [Guidelines for Air Quality Dispersion Modelling](#) in British Columbia published by the BC Ministry of Environment except as indicated in the [Metro Vancouver dispersion model template](#) or a model plan approved by Metro Vancouver.

MVAQ-D4: AIR QUALITY DISPERSION MODELLING

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MVAQ-D5: SUPPLEMENTAL TECHNICAL AND OTHER INFORMATION

Provide an itemized list of attached reports and documents (e.g., emission calculations, SDS or manufacturer documentation) that support the application.

REPORT NAME AND AUTHOR (WHERE APPLICABLE)	DATE
Semiahmoo Food Waste to RNG Process Description and Flow Diagram	24/3/2023
Corporate Registry Search	12/5/2023
MVAQ-CA Site Plan	14/3/2023
Semiahmoo D2 and D3 Emission Source Calculations	13/6/2023

MVAQ-D5: SUPPLEMENTAL TECHNICAL AND OTHER INFORMATION

REPORT NAME AND AUTHOR (WHERE APPLICABLE)	DATE

**MVAQ-E1: NOTICE OF APPLICATION FOR A PERMIT UNDER
GREATER VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT BYLAW**

This summary of the Application is filed with the DISTRICT DIRECTOR, METRO VANCOUVER. Any person who may be adversely affected by the discharge of air contaminants as described below may, within 30 days from the date of posting, publication, service or display, write to the DISTRICT DIRECTOR, METRO VANCOUVER, ENVIRONMENTAL REGULATION AND ENFORCEMENT DIVISION, 4730 KINGSWAY, BURNABY, BC, V5H 0C6, or email regulationenforcement@metrovancouver.org stating how they are affected. When making a decision on the permit or approval application, the District Director will consider the application, comments submitted and any responses provided by the applicant. Information collected during the comment period and the time following until a decision on the permit application has been made is collected under the authority of the **Freedom of Information and Protection of Privacy Act**. Your personal information and comment will be forwarded to the permit applicant for response to the District Director. By submitting a public comment, you consent to such disclosure.

1. In accordance with the provincial Environmental Management Act Public Notification Regulation,

SEMIAHMOO RNG GP CORP.

(Full name. If a company, British Columbia registered name)

of: Suite 650, 625 Howe Street, Vancouver, BC V6C 2T6

(Company address and postal code)

hereby apply for a Permit to discharge contaminants into the air from a(n):

Commercial scale food waste to renewable natural gas facility.

(Type of business or operation)

located at: 16535 & 16565 Beach Road, Surrey, BC

(Facility civic address and postal code)

The legal description of the land upon which the facility is located is:

Portions of Lot 10 Township 1 NWD Section 1 & 2, Semiahmoo First Nation Land

(Legal Land Description (Lot/Block/Plan) OR PID/PIN/Crown File No.)

2. The purpose of this Application is to request authorization to discharge air contaminants from:

an organic material resource recovery facility, comprised of 1) an AD plant for the treatment of packaged and post-consumer food waste, fat, oil and grease (FOG), and other organic feedstock; 2) a biogas cleaning and upgrading facility to produce RNG, and; 3) an associated wastewater treatment plant to reclaim nutrients and water from the effluent of the AD process before re-using water in the process and discharging the surplus into the public sanitary sewer.	
Website for more information:	https://www.andionglobal.com/public-notification-of-permit-application-semiahmoo-rng/

3. A summary of the emission characteristics is as follows:

- | | |
|---|--------------------|
| (a) Maximum total number of sources: | <u>5</u> |
| (b) Maximum duration of discharge of air contaminants in hours per year | <u>8760</u> |
| (c) Requested expiry date (YYYY-MMM-DD) | <u>2046-DEC-01</u> |
| (d) Emission characteristics: | |

Total Emissions from All Sources Based on Requested Limits

Air Contaminant (name)	Requested Authorized Emissions (tonnes/year)
Nitrogen Oxides (NOx)	2.789
Sulphur Dioxide (SO2)	0.523
Volatile Organic Compounds (VOC)	0.781
Ammonia (NH3)	0.406
Methane (CH4)	35.80
Hydrogen Sulphide (H2S)	0.108
Total	40.404

(e) Combustion processes: Primary fuel Biogas Secondary fuel _____

(f) Maximum Opacity: 5 per cent

Jun 29 2023
(Date)

Daniele Chiodini
(Print name of applicant or agent)

(Signature of applicant or agent)

**MVAQ-E1: NOTICE OF APPLICATION FOR A PERMIT UNDER
GREATER VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT BYLAW**

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**MVAQ-E2: NOTICE OF APPLICATION FOR A PERMIT AMENDMENT UNDER
GREATER VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT BYLAW**

This summary of the Application is filed with the DISTRICT DIRECTOR, METRO VANCOUVER. Any person who may be adversely affected by the discharge of air contaminants as described below may, within 30 days from the date of posting, publication, service or display, write to the DISTRICT DIRECTOR, METRO VANCOUVER, ENVIRONMENTAL REGULATION AND ENFORCEMENT DIVISION, 4730 KINGSWAY, BURNABY, BC, V5H 0C6, or email regulationenforcement@metrovancover.org stating how they are affected. When making a decision on the permit or approval application, the District Director will consider the application, comments submitted and any responses provided by the applicant. Information collected during the comment period and the time following until a decision on the permit application has been made is collected under the authority of the **Freedom of Information and Protection of Privacy Act**. Your personal information and comment will be forwarded to the permit applicant for response to the District Director. By submitting a public comment, you consent to such disclosure.

1. In accordance with the provincial Environmental Management Act Public Notification Regulation,

(Full name. If a company, British Columbia registered name)

of: _____

(Company address and postal code)

hereby apply for an amendment to Permit GVA _____ issued _____, and last amended _____ to discharge contaminants into the air from a(n):

(Type of business or operation)

located at: _____

(Facility civic address and postal code)

The legal description of the land upon which the facility is located is:

(Lot/Block/Plan OR PID/PIN/Crown File No.)

2. The purpose of this Application is to request authorization to:

Website for more information:	

3. A summary of the emission characteristics for the entire facility is as follows:

- (a) Maximum total number of sources: Current _____ Requested _____
- (b) Maximum duration of discharge of air contaminants in hours per year Current _____ Requested _____
- (c) Expiry date (YYYY-MMM-DD) Current _____ Requested _____
- (d) Emission characteristics:

Total Authorized and/or Estimated Emissions from All Sources

Air Contaminant (name)	Authorized Emissions (tonnes/year)	
	Current	Requested
Total		

- (e) Combustion processes: Primary fuel _____ Secondary fuel _____
- (f) Maximum Opacity: Current _____ per cent Requested _____ per cent

(Date)

(Print name of applicant or agent)

(Signature of applicant or agent)

**MVAQ-E2: NOTICE OF APPLICATION FOR A PERMIT AMENDMENT UNDER
GREATER VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT BYLAW**

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MVAQ-E3: NOTICE OF APPLICATION FOR A PERMIT (CURRENT PERMIT EXPIRING) UNDER GREATER VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT BYLAW

This summary of the Application is filed with the DISTRICT DIRECTOR, METRO VANCOUVER. Any person who may be adversely affected by the discharge of air contaminants as described below may, within 30 days from the date of posting, publication, service or display, write to the DISTRICT DIRECTOR, METRO VANCOUVER, ENVIRONMENTAL REGULATION AND ENFORCEMENT DIVISION, 4730 KINGSWAY, BURNABY, BC, V5H 0C6, or email regulationenforcement@metrovanouver.org stating how they are affected. When making a decision on the permit or approval application, the District Director will consider the application, comments submitted and any responses provided by the applicant. Information collected during the comment period and the time following until a decision on the permit application has been made is collected under the authority of the **Freedom of Information and Protection of Privacy Act**. Your personal information and comment will be forwarded to the permit applicant for response to the District Director. By submitting a public comment, you consent to such disclosure.

1. In accordance with the provincial Environmental Management Act Public Notification Regulation,

(Full name. If a company, British Columbia registered name)

of: _____

(Company address and postal code)

hereby apply for permit to discharge contaminants into the air from a(n):

(Type of business or operation)

located at: _____

(Facility civic address and postal code)

This site is currently authorized by Permit GVA _____ issued _____ and which expires _____

(permit #) (YYYY-MMM-DD) (YYYY-MM-DD)

The legal description of the land upon which the facility is located is:

(Lot/Block/Plan OR PID/PIN/Crown File No.)

2. The purpose of this Application is to request authorization to:

Website for more information: _____

3. A summary of the emission characteristics for the entire facility is as follows:

- (a) Maximum total number of sources: Current _____ Requested _____
- (b) Maximum duration of discharge of air contaminants in hours per year Current _____ Requested _____
- (c) Expiry date (YYYY-MMM-DD) Current _____ Requested _____
- (d) Emission characteristics:

Total Authorized and/or Estimated Emissions from All Sources

Air Contaminant (name)	Authorized Emissions (tonnes/year)	
	Current GVA	Requested
Total		

- (e) Combustion processes: Primary fuel _____ Secondary fuel _____
- (f) Maximum Opacity: Current _____ per cent Requested _____ per cent

(Date)

(Print name of applicant or agent)

(Signature of applicant or agent)

**MVAQ-E3: NOTICE OF APPLICATION FOR A PERMIT (CURRENT PERMIT EXPIRING) UNDER
GREATER VANCOUVER REGIONAL DISTRICT AIR QUALITY MANAGEMENT BYLAW**

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MVAQ-F1: DECLARATION

I understand that any information provided by Metro Vancouver Regional District (“Metro Vancouver”) staff during the review process is intended only to aid the applicant in producing a complete and accurate application package.

I understand that no part of the Metro Vancouver application review process suggests a final outcome of a decision by the District Director with respect to the authorization of air emissions to the atmosphere.

I understand that all information submitted as part of this application is determined solely by me, the applicant regardless of the origin of the information, including information obtained from Metro Vancouver staff.

I declare that the information given in this application is true, complete and accurate and that the submission of insufficient information may result in the application review process being delayed.

By submitting this application, I **authorize Metro Vancouver to publish on the Metro Vancouver website and to disclose inside and outside of Canada the entirety of the application information and all information submitted with the application, except for portions of the application information and/or submitted information that I/the applicant has explicitly and clearly indicated on the face of the document as “confidential” pursuant to section 21(1) of the BC *Freedom of Information and Protection of Privacy Act* (FOIPPA). In respect of such designated “confidential” information, I have provided to Metro Vancouver in writing with the application the applicant’s rationale as to why the disclosure of such confidential business information would reasonably be expected to cause the applicant harm, or how other reasons for non-disclosure listed in section 21(1) of FOIPPA are applicable, should the designated confidential information be subject to a request under section 5 of FOIPPA.** I understand that if I have any questions about the collection, use or disclosure of personal information, I may contact foippa@metrovancover.org.

In consideration of Metro Vancouver's Environmental Regulation and Enforcement Division receiving this application, **the Applicant agrees that it will indemnify and save harmless** Metro Vancouver, Greater Vancouver Sewerage and Drainage District, and their respective officers, directors, employees and agents (the "Indemnified Parties") from any claim for infringement of copyright or other intellectual property rights that the Indemnified Parties may sustain, incur, suffer or be put to at any time that arise from the publication of the application and/or other information submitted with the application.

Daniele Chiodini

Name (please print)



Signature

Group CTO

Title

2023-Jun-29

Date (YYYY-MMM-DD)

MVAQ-F1: DECLARATION

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Qualified Professional Declaration of Competency

Metro Vancouver Regional District’s Environmental Regulation and Enforcement Division relies on the work of Qualified Professionals¹. With this comes an assumption that professionals who undertake work in relation to Metro Vancouver permits, licences, and bylaws have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional _____

Title _____

2. Are you a registered member of a professional association in B.C.? Yes No

Name of Association: _____ Registration # _____

3. Brief description of specific professional services that will be provided:

This declaration of competency is collected under section 26(c) of the *BC Freedom of Information and Protection of Privacy Act* for the purpose of ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure inside or outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact foippa@metrovancouver.org.

Declaration

I am a Qualified Professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

Witnessed by:

Print Name:

Print Name:

Date signed:

¹ *Qualified Professional, in relation to a duty or function under MVRD and GVS&DD bylaws, means an individual who*

- a) *is registered in British Columbia with a professional association, is acting under that organization’s code of ethics, and is subject to disciplinary action by that association, and*
- b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

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Qualified Professional Conflict of Interest Disclosure Statement

A Qualified Professional ¹ providing services to a regulated person for the purpose of that person obtaining a permit, licence or an authorization from Metro Vancouver Regional District, or pursuant to a requirement imposed under the Environmental Management Act or a Bylaw, has a real or perceived conflict of interest when the Qualified Professional, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a Qualified Professional has:

- a) an ownership interest in the regulated person's business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the Qualified Professional in performing a duty or function.

Qualified Professionals who work under EMA and its regulations, including MVRD and GVS&DD Bylaws, must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and professionals must rely on guidance of their professional associations, their common sense, conscience and sense of personal integrity.

Declaration

Brief description of specific professional services that will be provided:

I _____, as a member of _____
(Print first name and last name) (Name of Professional Organization)

Declare

(over)

¹ *Qualified Professional, in relation to a duty or function under MVRD and GVS&DD bylaws, means an individual who*

- a) *is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and*
- b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Select one of the following:

Absence from conflict of interest

Other than the standard fee I will receive for my professional services described above, I have no financial or other interest in the outcome of this _____.
(application, project, work, etc)

I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Metro Vancouver Regional District, Environmental Regulation and Enforcement Division, erring on the side of caution.

Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purpose of supporting transparency of government decision-making and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure inside and outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact foippa@metrovancover.org.

Signature:

X

Print Name:

Date signed:

Witnessed by:

X

Print Name:

APPLICATION COMPLETENESS CHECKLIST

	✓ or N/A
SECTION A: Business Information and Purpose of Application	
All fields marked with an asterisk filled in	
Corporate registry documents attached	
Signed Qualified Professional Declaration of Competency attached	
Signed Qualified Professional Conflict of Interest Disclosure Statement attached	
Map showing location of sensitive receptors attached	
Land title documents attached, if required	
Section A signed by Applicant or Agent	
SECTION B: Process Description & Schematic Flow Diagram	
Descriptive process narrative attached	
Simplified process block diagram highlighting all emission sources attached	
Safety Data Sheets for all relevant materials attached	
Emission control equipment schematics and specifications attached	
SECTION C: Site Plan	
Legible, simplified 8.5 x 11" black and white site plan with adjacent geographic references (major streets, water bodies, etc.), and emission sources clearly labelled	
SECTION D: Technical Assessment	
D1 Emission Source Summary table attached	
D1a Existing Emission Source Comparison attached when application is for an amendment or expiring permit	
D2 Emission Information for Point Sources attached for each new or modified source, and all fields marked with an asterisk filled in or deviations explained	
D3 Emission information for Fugitive Sources attached for each new or modified source, and all fields marked with an asterisk filled in or deviations explained	
D4 Metro Vancouver Air Quality Dispersion Modelling Plan attached	
D4 Air Quality Dispersion Modelling Report attached only if Metro Vancouver Dispersion Modelling Plan approved (see guidance)	
D5 Includes supplemental technical and other information table and attachments, such as but not limited to,	
Environmental Management System documents such as relevant Standard Operating Procedures	
Dust Management Plan	
Odour Management Plan	

APPLICATION COMPLETENESS CHECKLIST

	✓ or N/A
Calculations and references to support requested emissions	
Environmental or human health impact assessments	
Emissions monitoring reports or emissions inventory reports	
SECTION E: Notice of Application attached (identify relevant NOA)	
E1 First - time permits	
E2 - Permit amendments, or	
E3 - Permits with expiry dates	
SECTION F: Declaration and Application Fees	
FINAL application only – signed declaration	
FINAL application only – payment for invoiced application fees	



Semiahmoo RNG Facility Air Permit Application – Process Description and Schematic Flow Diagram

***Semiahmoo First Nation Land,
British Columbia***

Greater Vancouver Regional District
Air Quality Management Bylaw No. 1082, 2008ng



**POWERED BY WASTE
DRIVEN BY INNOVATION**

1030 – 625 Howe Street,
Vancouver, BC V6C 2T6



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Overview

Andion North America Limited (“Andion”), in partnership with Semiahmoo First Nation, is planning to develop, build, own, and operate a commercial scale food waste to renewable natural gas facility (the “Project”). The Project will be situated on the federally administered reserve lands of Semiahmoo First Nation, near the Peace Arch border crossing on British Columbia Highway 99. The Project is targeted to commence construction in Q2 2022 and be fully commissioned in Q2 2023.

Using Andion’s proven proprietary anaerobic digestion (“AD”) solution, the Project will transform organic waste collected within Metro Vancouver, currently routed to landfills, into nutrients in the form of stabilized digestate and ammonium sulphate, and energy in the form of biogas. The Project is scaled to receive up to 125,000 tonnes of food waste per year and produce approximately 23,000 tonnes of stabilized digestate, 2,200 tonnes of ammonium sulphate and 150,000 GJ of renewable natural gas (“RNG”). On an annual basis, the Project will also treat and reuse 40,000 m³ of process water and eliminate approximately 23,000 tonnes of greenhouse gases emissions.

The Project will achieve the following benefits:

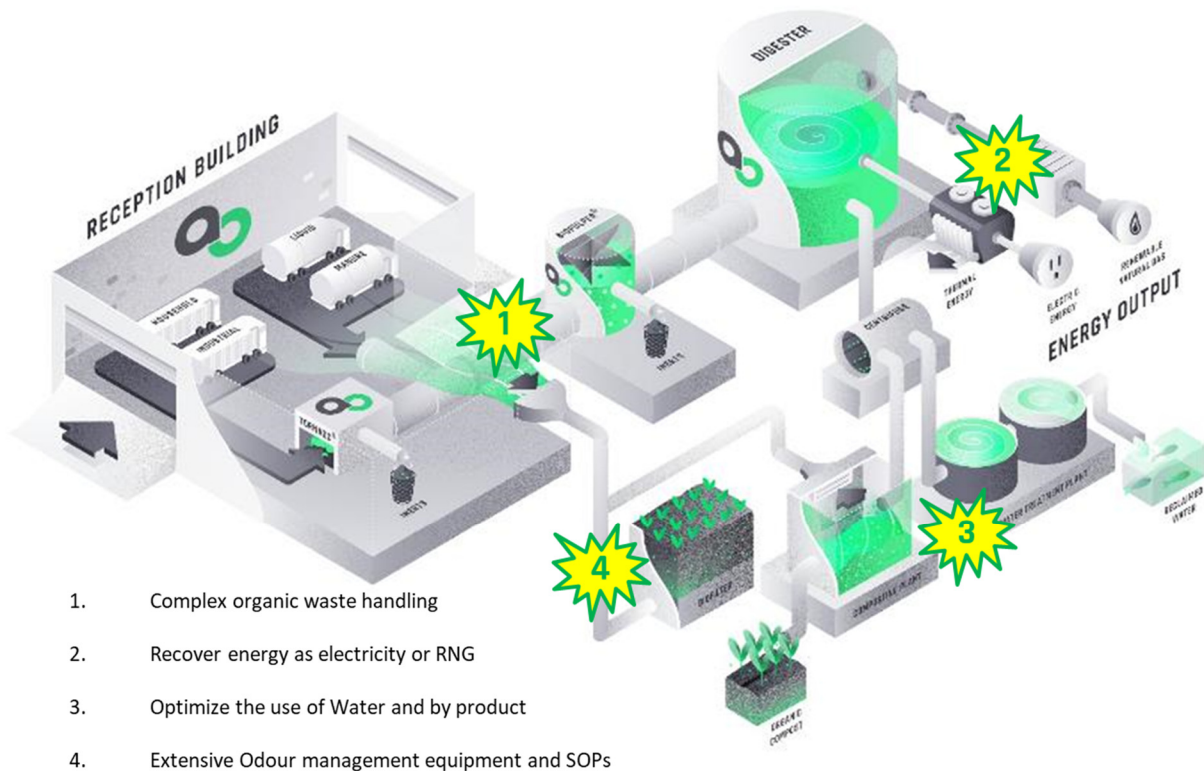
- ✓ diversion of organic waste from regional landfill;
- ✓ energy recovery from the organic feedstock by production of RNG;
- ✓ nutrient recovery by production of ammonium sulphate and stabilized digestate, a valuable soil amendment;
- ✓ treatment of liquid effluent from the Project for re-use in plant processes and discharge of surplus treated water to the public sanitary sewer; and
- ✓ overall reduction of GHG (Green House Gas) emissions.

1 The Project

The Project described in this document is an organic material resource recovery facility, comprised of 1) an AD plant for the treatment of packaged and post consumer food waste, fat, oil and grease (FOG), and other organic feedstock; 2) a biogas cleaning and upgrading facility to produce RNG, and; 3) an associated wastewater treatment plant to reclaim nutrients and water from the effluent of the AD process before re-using water in the process and discharging the surplus into the public sanitary sewer.

1.1 Project Technology and Benefits

Andion’s commercially proven proprietary technology offers a fully integrated process that addresses the critical flaws of other AD facilities and provides a competitive advantage over other organic waste disposal methods, such as composting and municipal solid waste incineration. The technology offered by Andion is unique with regards to the comprehensive approach and, most importantly, to the unique solution for treating difficult substrates such as food waste, organic waste, commercial waste, farm waste and slaughterhouse waste.



1. Complex organic waste handling
2. Recover energy as electricity or RNG
3. Optimize the use of Water and by product
4. Extensive Odour management equipment and SOPs

1.1.1 Tornado®

Complex organic waste, which is not source separated and can contain various levels of contaminants (non-organic materials) and inconsistencies in the type of organic waste that is present, is first handled by the proprietary Tornado® technology. The proprietary Tornado® system is designed to be the one-stop fully automated solution for waste de-packaging and inert material removal. This system is a key section of the overall facility, allowing for varying qualities of feedstock to be processed without impacting the reliability of the waste treatment process. The Tornado® sorts the feedstock into plastics and packages, inert heavy material and clean organic slurry for use in the AD process. The separated plastics and packages and the inert heavy material are sent for further recycling to support the zero-waste economy.





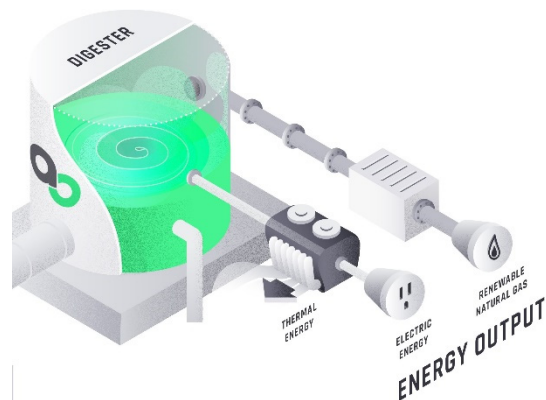
1.1.2 Biopulper®



From the Tornado the clean organic slurry is sent to the Biopulper®, which uses proprietary technology, for further processing prior to being used in the AD process. The Biopulper® further refines the clean organic slurry by removing fine heavy contaminants, such as grit and dirt.

1.1.3 Digester

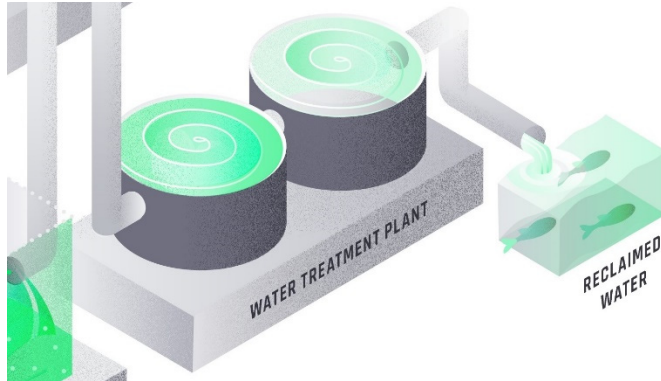
From the Biopulper® the refined clean organic slurry is then sent to the AD reactor to start the AD process. Instead of using tanks with domed roofs, which is what is traditionally used with other AD facilities, Andion uses tanks with a flat roof, which allows for the installation of a vertical mixing system and is less expensive to maintain. The vertical mixing system ensure that there are no swimming layers on the top of the tank, which can hinder the AD process. The digester tank has a conical bottom, which allows for sediments not addressed by the Biopulper® to settle at the bottom of the cone and be easily removed without having to access the digester tank. Finally, all components and piping of the heat exchange system are located outside of the digester tank, making it easier and quicker to maintain. The overall AD process and reactor tank was designed to enable the tank to be maintained externally, without the need to ever open the tank, resulting in the AD process to theoretically run continuously for the entire life of the facility, meaning no downtime or lost production.



From the AD process, RNG or renewable electricity is produced, which can be used to offset the use of non-renewable resources and maximizes the use of the organic material relative to composting and incineration.

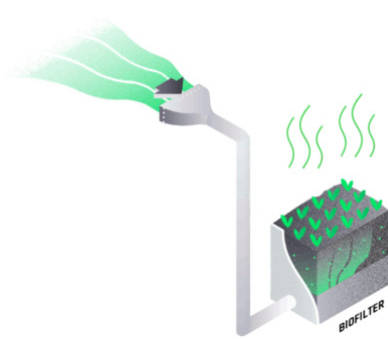


1.1.4 Integrated Wastewater Treatment and Water Reclamation



Andion designs its AD waste-to-energy facilities to be able to incorporate wastewater treatment and water reclamation. Wastewater treatment on-site eliminates the need for the disposal issues associated with leachate and wastewater, which would otherwise have to be transported to another facility for treatment. The treated water can be reclaimed to be used again, particularly advantageous for areas where water is a scarce resource.

1.1.5 Odour Management



One of the biggest hurdles that organic diversion solutions encounter, whether the solution be composting, incineration or AD, is the odour issue. The process to mitigate odours at an Andion AD waste-to-energy facility immediately starts when the feedstock is transported to the site. All buildings, including the waste receiving area, are kept in negative pressure environments and all processing activities are performed inside these areas. A set of blowers ensure odours do not leak from the buildings and all air is further processed through a double stage system of wet scrubbing and biofiltration.

The design of the AD tanks, beyond the ability to being able to operate uninterrupted throughout the life of the project, also has the benefit of controlling odours. Because the tanks are fully enclosed and never need to be opened for maintenance, odours do not escape as would for other AD facilities.

1.1.6 GHG Mitigation / Carbon Dioxide Capture

One of the main benefits of the AD waste-to-energy solution as an organic diversion method compared to composting is the ability to mitigate and control GHG emissions. Composting occurs in an aerobic environment, and thus is usually sited in an open environment and the GHG emitted (primarily carbon dioxide) is not captured. With Andion's AD solution, the AD process produces biogas (methane), which is captured for energy generation. The amount of carbon dioxide that is also produced as part of the AD process is much less than the amount of carbon dioxide produced during composting, thus the AD process results in less GHG emissions than composting.

2 Process Description

2.1 Incoming feedstock

The Semiahmoo facility is designed to receive feedstock delivered in bulk or containers, stock it in a dedicated area and pre-treat it to remove contaminants. Complex organic waste, which is not source



separated, can contain various levels of contaminants (inert non-organic materials, such as packaging) and inconsistencies in the type of organic waste that is present.

The Project is scaled to receive up to 125,000 tonnes of food waste per year, which will produce approximately 100,000 tonnes of organic feed stock after packaging and other inert contaminants are removed in the pre-treatment processes. Types of food waste the facility is designed accept include:

- Source separated organic waste from multi-family residentials (MF);
- Source separated organic waste from single-family residentials (SF);
- Source separated organic waste from industrial, commercial and institutional facilities (ICI);
- Fats, oils, and greases (FOG), and other organic liquid products (LW)

Under normal operation, the Project is expected to process 85,000 wet tonnes per year of organic waste feedstock (approximately 70,000 tonnes of organic feed stock after packaging and other inert contaminants are removed). Variability in feedstock quality means that, from time to time, some delivered material could be unsuitable for the process. The maximum design capacity of the site allows for unsuitable material to be diverted to a holding area, and eventually removed from site to other regulated disposal facilities, while maintaining a constant production of RNG. The anticipated breakdown of material feed rates, under both design and maximum conditions is provided in Table 1.

Table 1: Expected organic material feed rates to the anaerobic digestion process

Feedstock	Maximum quantity	Design quantity	Maximum quantity	Design quantity
	ton/year	ton/year	ton/week	ton/week
MF Organics	45,000	30,000	865	577
SF Organics	10,000	5,000	192	96
ICI Organics	55,000	40,000	1,058	769
FOG and LW	15,000	10,000	288	192
TOTAL	125,000	85,000	2,403	1,635

2.2 Organic Waste Processing and Digestion

2.2.1 Reception and storage of organic materials (Fugitive Emission FES-01)

Organic food waste is delivered to the plant by truck. The trucks are weighed onsite and then directed to an unloading area in the reception building.

The reception building is equipped to receive the food waste through truck bays and roll-up doors. Different receiving bays are designed to accommodate a variety of truck and waste types (e.g. pallet packed organic waste and bulk organic waste are delivered to different bays). The vehicles will reverse into an available truck bay and discharge the organic waste into a dedicated and contained area.



[REDACTED]

[REDACTED] As much as possible, access doors to the building will also be kept closed to reduce the emission of odours originating from the reception area. Despite this effort, a small amount of odour may escape while the doors are open and bulk food waste is being delivered (**FES-01**). The majority of odour is expected to be captured by the negative pressure of the building and any fugitive emission odours from delivery are not expected to migrate past the site boundaries.

Commercial waste (primarily ICI waste) is typically delivered on wooden frame pallets which are unloaded with a forklift by the operators. These materials usually do not represent a source of odour since they are packaged. During the delivery, the truck operators drive backward up to the unloading bay where the operators can start the process of unloading the food waste and manually opening packages. [REDACTED]

All food waste that is received will be inspected to ensure that it is suitable for anaerobic digestion. A roll off container, positioned inside the reception building (stored under negative pressure), will receive food waste deemed to be unsuitable so that it can be diverted to other regulated disposal facilities. Once full, the container is picked up by a third-party hauling company.

Liquid waste that is low in solids (e.g. FOG, dairy waste, beverage waste, etc.) will be delivered by tanker trucks and received in a dedicated receiving bay. Once in position, the operator of the tanker truck connects a flexible hose to a pumping station which will drain the tanker truck into the plant's liquid waste holding tank. A sealed connection means that odours from the waste are not released to the external environment.

#

2.2.2 Pre-treatment system

Complex organic waste, which is not source separated, can contain various levels of contaminants (non-organic materials, such as packaging) and inconsistencies in the type of organic waste that is present. The pre-treatment system is designed to process different types of food waste, allowing for high flexibility in the quality of the incoming waste. This equipment will remove most of the impurities and non-processable materials present in the food waste to protect the downstream processes. Like the bulk waste reception area, all the pre-treatment area will be maintained under negative pressure with evacuated air treated for odours as detailed in Section 2.5.

Using a front loader, waste will be moved and loaded into the pre-treatment system, which will be comprised of the following equipment:



The last phase of the pre-treatment process uses Andion's proprietary Tornado® system (detailed in Section 1.1.1) to remove the packaging and inert material that is not captured by the [REDACTED]. The Tornado® sorts the feedstock into plastics and packages, inert heavy material (e.g. stones and grit) and clean organic slurry for use in the AD process.

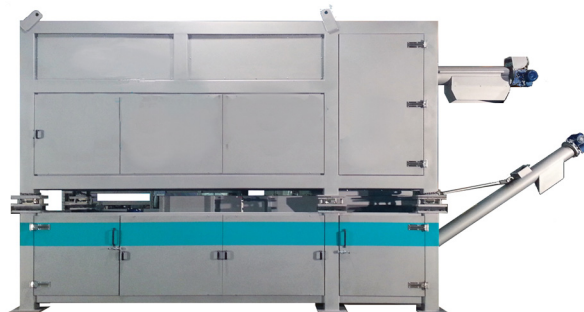


Figure 1: Andion's Tornado system

The materials discharged from the Tornado include:

- A pure, refined, organic stream comprising more than 95% of the treated material, which will be sent to the next phase of anaerobic digestion.
- A reject stream composed of fibrous materials and plastics (for use as Refuse-Derived Fuel) that will be discharged in a dedicated conveyor belt.
- A reject stream composed of heavy inorganic materials, such as grit, that will be discharged to another dedicated conveyor belt.



2.2.3 Leachate Management



2.2.4 Biopulper tank

The Biopulper is a concrete cylindrical tank, with a conical bottom, installed for the purpose of 1) Mixing and homogenizing of the organic material, and 2) Providing hydraulic retention time, before feeding it to the anaerobic digester.



2.2.5 Anaerobic digestion with hot water boiler (Point Source Emission ES-03)



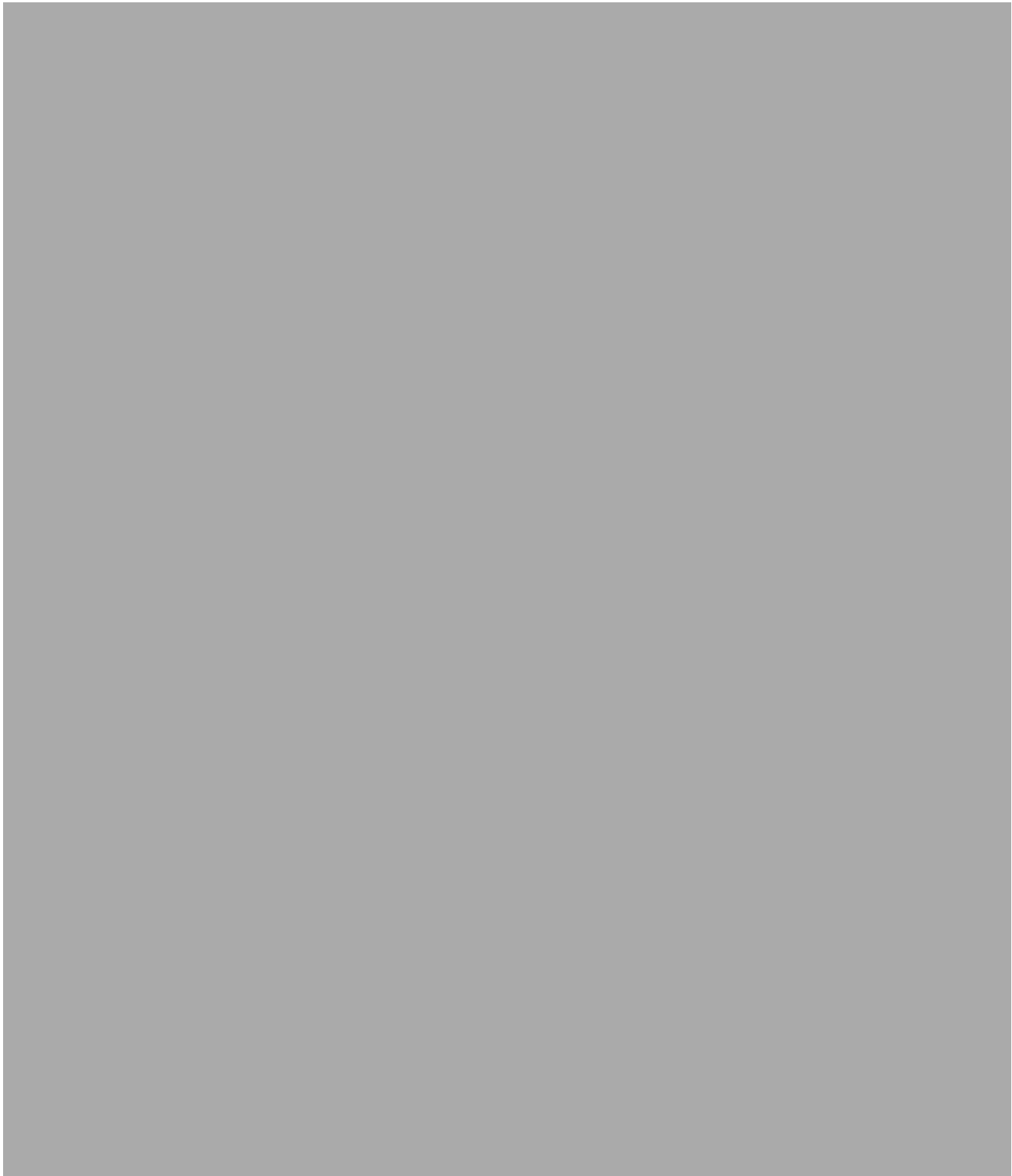


Figure 2: Example of anaerobic digester and associated heat exchanger

2.3 Biogas Handling and RNG Production

Biogas produced from anaerobic digestion will be conveyed by pipe to the washing and dewatering processes before being upgraded to RNG. In the instance of equipment shutdown/maintenance, or excess production of biogas, biogas will instead be sent to an emergency safety flare.

2.3.1 Storage and treatment of biogas (Point Source Emission E05)





2.3.2 Biogas Upgrading System (Point Source Emission ES-02)





2.3.3 Emergency Safety Flare (Point Source Emission ES-04)



2.4 Wastewater Treatment and Reuse

2.4.1 Ammonia Removal and Recovery (Point Source Emission ES-05)

Reducing the ammoniacal nitrogen concentration in the digestate allows the stabilized digestate to be used as an agricultural soil amendment in regions where nutrient load will limit its application. In addition, once dewatered, the liquid fraction of the digestate, which is also lower in ammoniacal nitrogen, becomes suitable for both reuse as process water in the plant and for sanitary sewer discharge.

The process used to remove and recover ammonia is a batch process with the following main steps:

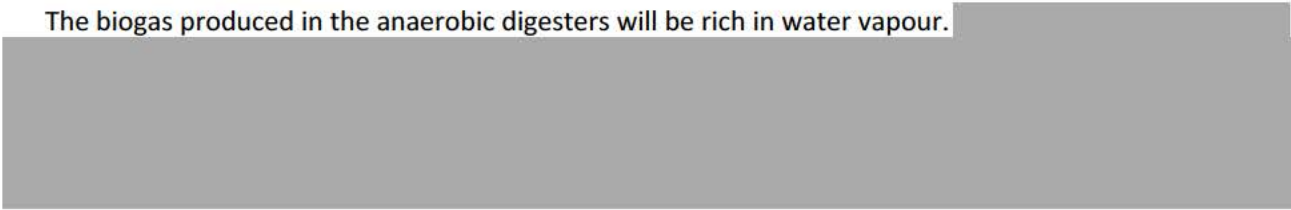






2.4.2 Condensate line

The biogas produced in the anaerobic digesters will be rich in water vapour.



2.4.3 Final Dewatering



2.4.4 Equalization



2.5 Odour treatment line (Point Emission Source ES-01)

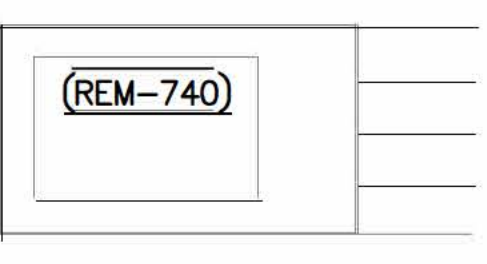
Air that is constantly evacuated from the reception and pre-treatment buildings, the Biopulper and the final dewatering liquid equalization tank, is processed through odour treatment.







3 Project Layout



LEGEND

- WH-001 Weight scale system
- MA-002 Trucks manouvring area
- EG-003 Entrance gate
- ER-005 Elevation ramp
- REB-030 Food scraps tipping floor
- BA-030A Food scraps temporary storage area
- BA-030B Packaged food scraps temporary storage area
- BA-030C Food scraps transferring area
- TK-030 FOG tank
- PTB-040 Processing building
- ECR-040 Electrical room
- BX-040B Rejects from Metals separation - Storage area
- BX-040E Dewatered reject material - Storage area
- TK-040 Process water buffer tank
- BP-050 Biopulper
- MS-050 Pre-engineered equipment room

- AD-100 Anaerobic digester
- ECR-100 Pre-engineered electrical room
- TCR-100 Transformer cabinet room
- MS-100 Pre-engineered equipment room
- CD-110 Cold digester and Gas holder
- SF-120 Safety flare
- BGS-130A/B Biogas scrubbers
- TK-130 Caustic Soda storage tank
- CH-140 Chiller

- CEB-200 Sludge Dewatering
- STG-200 Dewatered digestate storage area
- TK-200 Ferric chloride tanks
- BB-200 Dewatering buffer tank
- CHR-210 Polymer preparation room

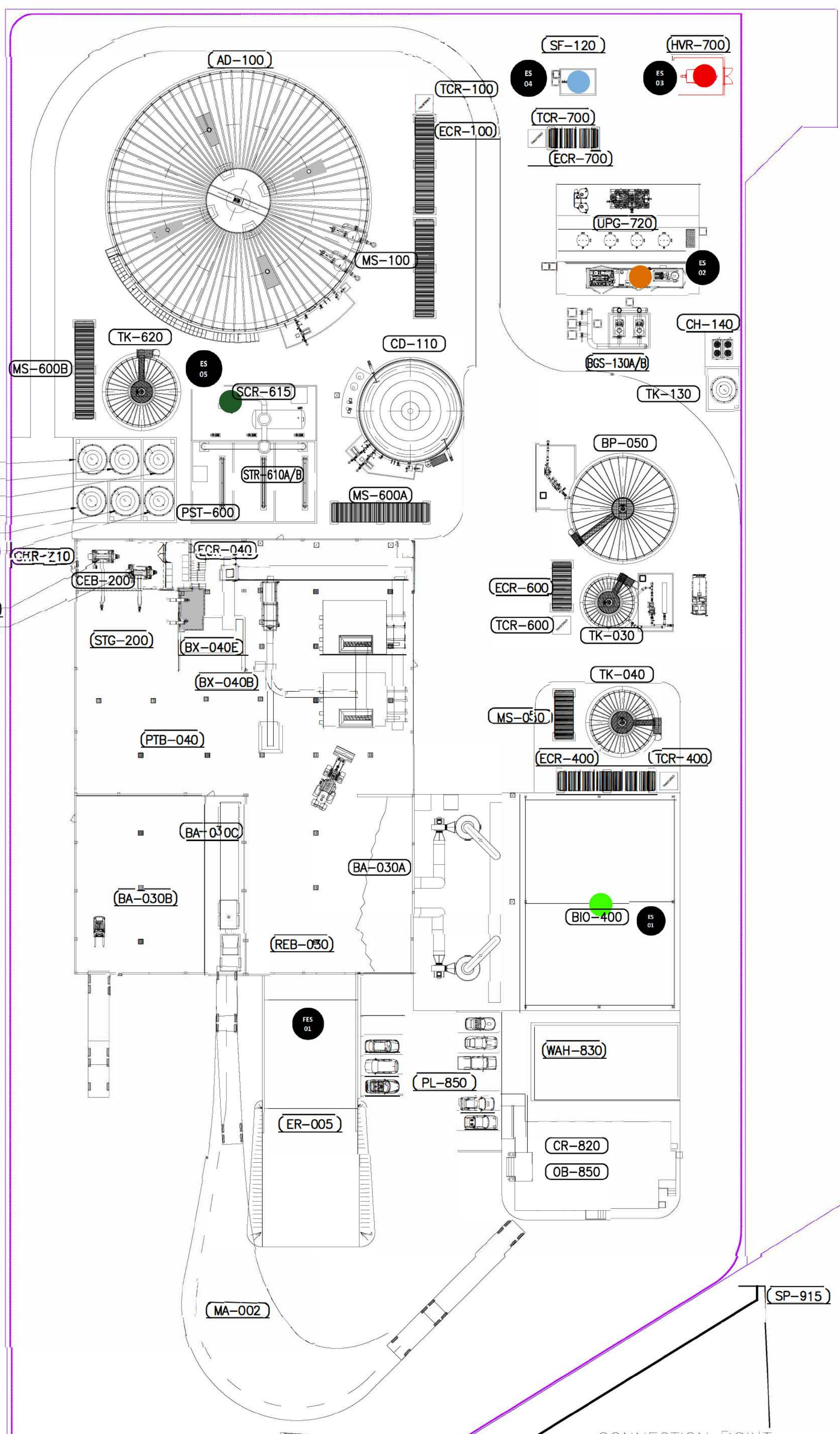
- BIO-400 Biofilter for processing building
- ECR-400 Pre-engineered electrical room
- TCR-400 Transformer

- PST-600 Pre-stripping tank
- ECR-600 Pre-engineered electrical room
- TCR-600 Transformer
- MS-600A/B Pre-engineered equipment room
- STR-610A/B Stripping reactor tank
- TK-610A Antifoam storage tank
- TK-610B Caustic soda storage tank
- TK-610C CIP solution storage tank
- SCR-615 Scrubber for stripping unit
- TK-615A Sulphuric acid storage tank
- TK-615B/C Ammonium sulphate storage tank
- TK-620 Buffer tank

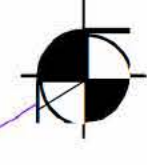
- ECR-700 Pre-engineered electrical room
- TCR-700 Transformer
- HWR-700 Boiler room
- UPG-720 Biogas upgrading unit
- REM-740 FORTIS connecting cabinet

- ENP-800 Proposed interconnection gear
- CR-820 Plant control room
- WAH-830 Warehouse
- OB-850 Office, laboratory, toilets and dressing room building

- PL-850 Parking lot
- SP-915 Private sewer pump station



DATUM



CONNECTION POINT WATER & SFWR

LEGEND

DESCRIPTION	No.	POSITION	
		X [feet]	Y [feet]
BIOFILTER - ODOUR TREATMENT LINE	ES-01	175.5	78.1
OFF-GAS FROM BIOGAS UPGRADING SYSTEM	ES-02	184.6	418
GASES FROM NATURAL GAS HOT WATER BOILER	ES-03	91.3	337.3
EMERGENCY FLARE SYSTEM	ES-04	125.8	420.6
AMMONIA STRIPPING TOWER	ES-05	328.5	286

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tel: +39 02 36737160/61
web site: www.andiontech.com

3rd ANGLE PROJECTION

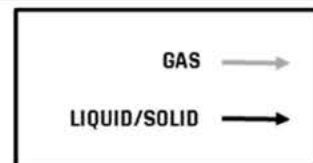
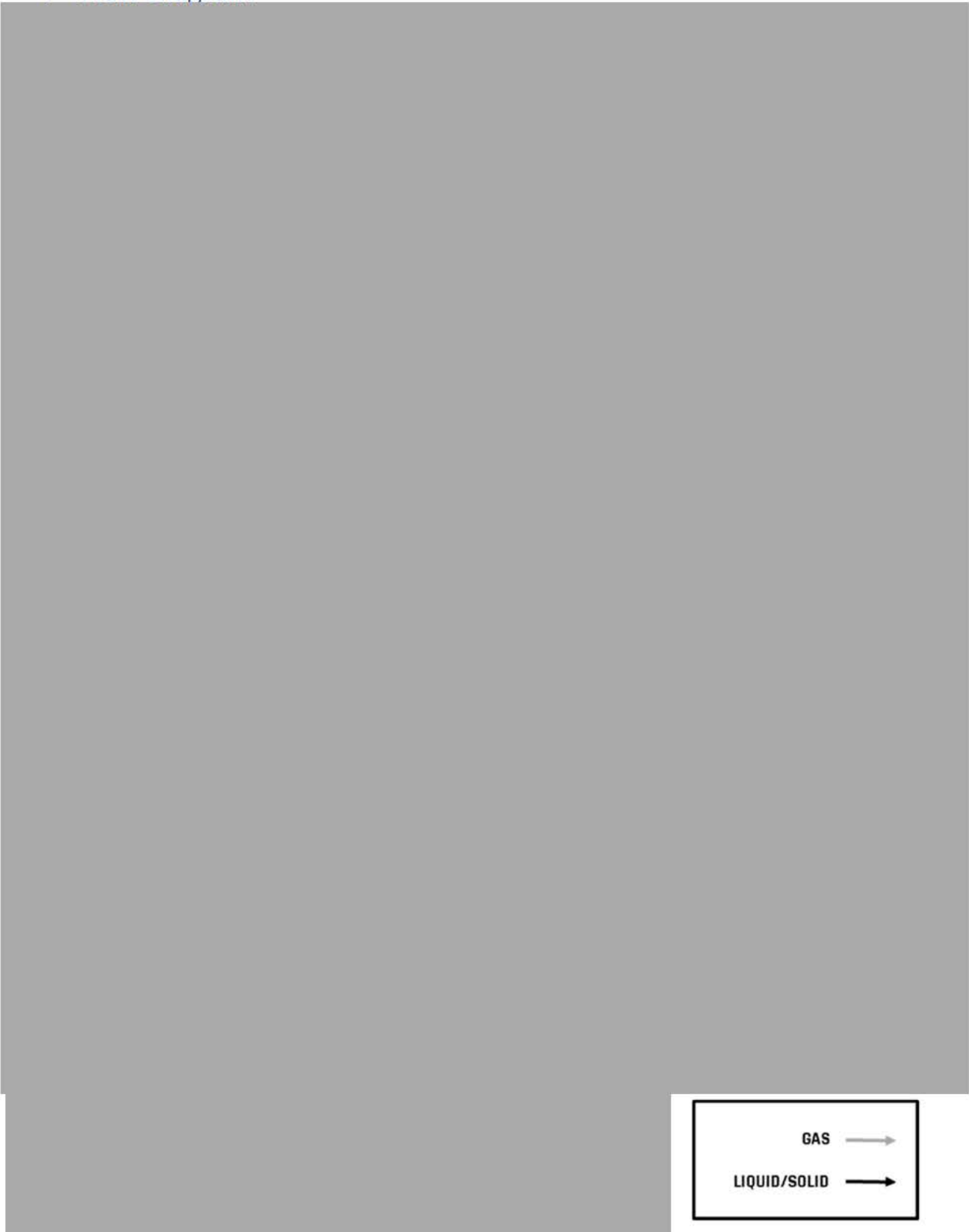
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SEMIAHMOO
FOOD SCRAPS TO ENERGY PLANT
LOCATION OF EMISSION POINTS TO THE ATMOSPHERE

DOCUMENT NAME: 19034A T.PD.10 DWG. N°: T.PD.10



4 Flow Diagram





Number: BC1416081

CERTIFICATE OF INCORPORATION

BUSINESS CORPORATIONS ACT

I Hereby Certify that SEMIAHMOO RNG GP CORP. was incorporated under the Business Corporations Act on May 12, 2023 at 03:38 PM Pacific Time.



ELECTRONIC CERTIFICATE

Issued under my hand at Victoria, British Columbia

On May 12, 2023

T.K. SPARKS

Registrar of Companies
Province of British Columbia
Canada



BC Company Summary

For SEMIAHMOO RNG GP CORP.

Date and Time of Search: June 30, 2023 02:00 PM Pacific Time
Currency Date: September 20, 2022

ACTIVE

Incorporation Number: BC1416081
Name of Company: SEMIAHMOO RNG GP CORP.
Business Number: 752804211 BC0001
Recognition Date and Time: Incorporated on May 12, 2023 03:38 PM Pacific Time
Last Annual Report Filed: Not Available

In Liquidation: No
Receiver: No

REGISTERED OFFICE INFORMATION

Mailing Address:
SUITE 2500 PARK PLACE
666 BURRARD STREET
VANCOUVER BC V6C 2X8
CANADA

Delivery Address:
SUITE 2500 PARK PLACE
666 BURRARD STREET
VANCOUVER BC V6C 2X8
CANADA

RECORDS OFFICE INFORMATION

Mailing Address:
SUITE 2500 PARK PLACE
666 BURRARD STREET
VANCOUVER BC V6C 2X8
CANADA

Delivery Address:
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666 BURRARD STREET
VANCOUVER BC V6C 2X8
CANADA

DIRECTOR INFORMATION

Last Name, First Name, Middle Name:
Abrary, F. Phillip

Mailing Address:
4390 ERWIN DRIVE
WEST VANCOUVER BC V7V 1H6
CANADA

Delivery Address:
4390 ERWIN DRIVE
WEST VANCOUVER BC V7V 1H6
CANADA

Last Name, First Name, Middle Name:

Streeter, Eric

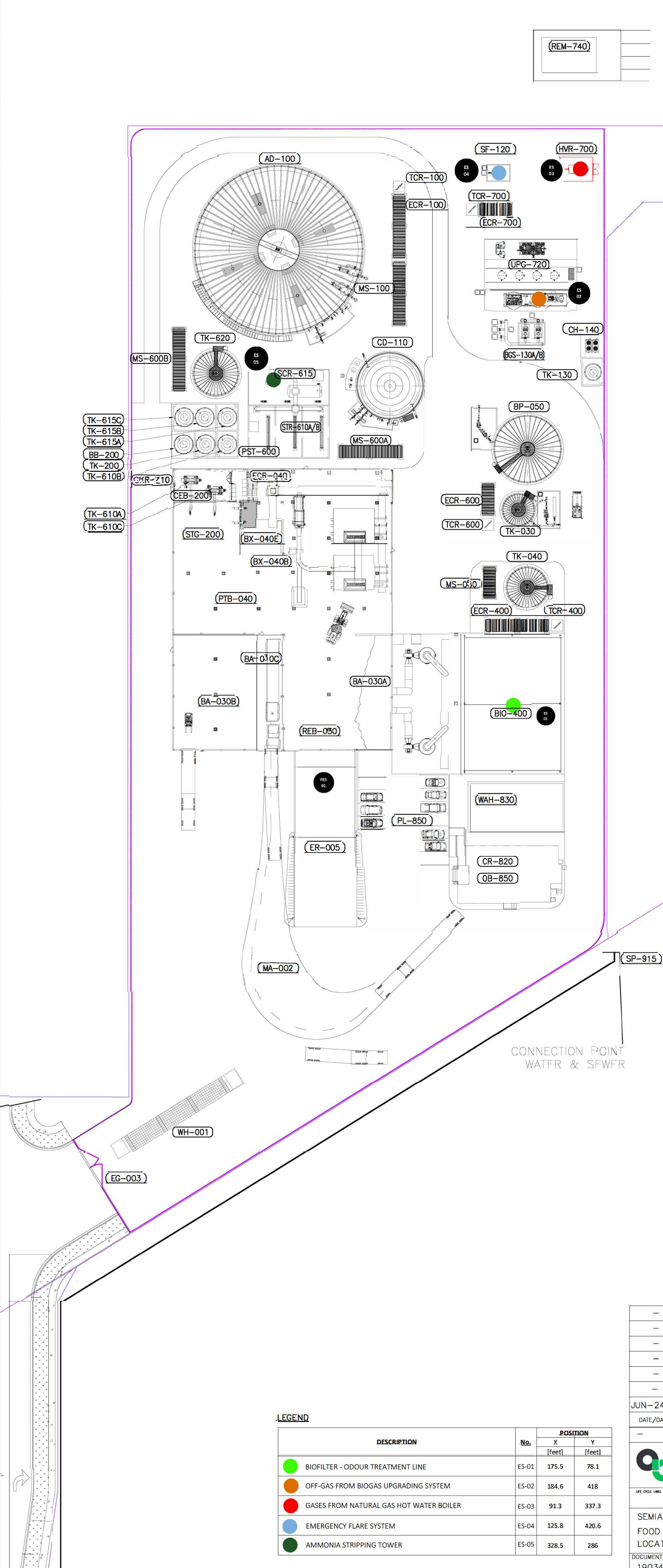
Mailing Address:

240 ROCHE POINT DRIVE
NORTH VANCOUVER BC V7G 2M9
CANADA

Delivery Address:

240 ROCHE POINT DRIVE
NORTH VANCOUVER BC V7G 2M9
CANADA

NO OFFICER INFORMATION FILED .



- LEGEND**
- WH-001 Weight scale system
 - MA-002 Trucks manouvring area
 - EG-003 Entrance gate
 - ER-005 Elevation ramp
 - REB-030 Food scraps tipping floor
 - BA-030A Food scraps temporary storage area
 - BA-030B Packaged food scraps temporary storage area
 - BA-030C Food scraps transferring area
 - TK-030 FOG tank
 - PTB-040 Processing building
 - ECR-040 Electrical room
 - BX-040B Rejects from Metals separation - Storage area
 - BX-040E Dewatered reject material - Storage area
 - TK-040 Process water buffer tank
 - BP-050 Biopulper
 - MS-050 Pre-engineered equipment room

 - AD-100 Anaerobic digester
 - ECR-100 Pre-engineered electrical room
 - TCR-100 Transformer cabinet room
 - MS-100 Pre-engineered equipment room
 - CD-110 Cold digester and Gas holder
 - SF-120 Safety flare
 - BGS-130A/B Biogas scrubbers
 - TK-130 Caustic Soda storage tank
 - CH-140 Chiller

 - CEB-200 Sludge Dewatering
 - STG-200 Dewatered digestate storage area
 - TK-200 Ferric chloride tanks
 - BB-200 Dewatering buffer tank
 - CHR-210 Polymer preparation room

 - BIO-400 Biofilter for processing building
 - ECR-400 Pre-engineered electrical room
 - TCR-400 Transformer

 - PST-600 Pre-stripping tank
 - ECR-600 Pre-engineered electrical room
 - TCR-600 Transformer
 - MS-600A/B Pre-engineered equipment room
 - STR-610A/B Stripping reactor tank
 - TK-610A Antifoam storage tank
 - TK-610B Caustic soda storage tank
 - TK-610C CIP solution storage tank
 - SCR-615 Scrubber for stripping unit
 - TK-615A Sulphuric acid storage tank
 - TK-615B/C Ammonium sulphate storage tank
 - TK-620 Buffer tank

 - ECR-700 Pre-engineered electrical room
 - TCR-700 Transformer
 - HWR-700 Boiler room
 - UPG-720 Biogas upgrading unit
 - REM-740 FORTIS connecting cabinet

 - ENP-800 Proposed interconnection gear
 - CR-820 Plant control room
 - WAH-830 Warehouse
 - OB-850 Office, laboratory, toilets and dressing room building

 - PL-850 Parking lot
 - SP-915 Private sewer pump station

DATUM



CONNECTION POINT WATER & SFWR

LEGEND

DESCRIPTION	No.	POSITION	
		X [feet]	Y [feet]
BIOFILTER - ODOUR TREATMENT LINE	ES-01	175.5	78.1
OFF-GAS FROM BIOGAS UPGRADING SYSTEM	ES-02	184.6	418
GASES FROM NATURAL GAS HOT WATER BOILER	ES-03	91.3	337.3
EMERGENCY FLARE SYSTEM	ES-04	125.8	420.6
AMMONIA STRIPPING TOWER	ES-05	328.5	286

DATE/DATA	REV.	COMMENTS/COMMENTI	STC	ELD	LUO
JUN-24-20	0	ISSUED FOR APPROVAL	STC	ELD	LUO
			DRAWN BY DISEGNATO DA	CHECKED BY CONTROLLATO DA	APPROVED BY APPROVATO DA

Andion Italy S.p.A.
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Milano (MI) 20134 Italia
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web site: www.andiontech.com

3rd ANGLE PROJECTION

PROPRIETÀ RISERVATA. A TITOLO DI LEGGE LA ANDION S.p.A. SI RISERVA LA PROPRIETÀ DEL PRESENTE DISEGNO CHE POTREBBE NON ESSERE NE' RIPRODOTTO NE' COMUNICATO A TERZI SENZA LA PRECEDENTE AUTORIZZAZIONE DELLA ANDION S.p.A.

SEMIAHMOO
FOOD SCRAPS TO ENERGY PLANT
LOCATION OF EMISSION POINTS TO THE ATMOSPHERE

DOCUMENT NAME: 19034A T.PD.10 DWG. N°: T.PD.10

W.O. 19034A
DIM. ANSI D
DRAWING SCALE 1"=30'
PAGE 1 of 1

From Andion Model:

Air Flow	1167	Nm3/min
	1167	Am3/min
Filter area	492	m2
Effective Diameter	25	m
velocity	0.04	m/s

EU max

Contaminant	Outlet Conc (mg/m3)	Emission (tonne/y)
VOC	20	12.26
H2S	2	1.23
NH3	5	3.07
Odour Units (OU)	280	

Summation of biofilter sample

Contaminant	Outlet Conc (mg/m3)	Emission (tonne/y)	note
VOC	1.267	0.78	
H2S	0.16	0.10	<0.23
NH3	0.11	0.07	
Odour Units (OU)	280		

H2s reference

mg/m3	ppm	ou
	0.00041	1
2	1.4	3497.6
0.16	0.1	279.8

Estimate of VOCs content in the gas flow sent to the biofilter

The estimate, as a safety factor, was calculated from the estimate emissions of VOCs during aerobic composting of OFW
Reference: *Anaerobic digestion of organic solid wastes. An overview of research achievements and perspectives*. Mata-Al

Food Waste Inlet (OFW)

70000 tonnes/y
191.8 7d/7

Biofilter flow rate

70,000 m3/h

Aerobic Pollutants	Specific load (g/t OFW)	Load (g/d)	Inlet gas flow (mg/m3, %)	
Alcohols	283.6	54,389	32.4	48%
Ketones	150.4	28,844	17.2	26%
Terpenes	82.4	15,803	9.4	14%
Esters	52.7	10,107	6.0	9%
Organic sulphides	9.3	1,784	1.1	2%
Aldehydes	7.5	1,438	0.9	1%
Ethers	2.6	499	0.3	0%
Total VOCs	588.5	112,863	67.2	100%
NH3	158.9	30,474	18.1	
Total pollutants	747.4	143,337	85.3	

Mozzate Biogas facility odour control sampling (6/03/2017)

	Odour Units (OU/Nm3)			
	Sample 1	Sample 2	Average	Removal
Inlet to Water Scrubber	1500	1700	1600	-
Outlet of Water Scrubber, Inlet to Biofilter	920	810	865	46%
Outlet of Biofilter	260	190	215	75%
a	260	190		
b	280	180		
c	240	140		

Sample 11/10/2016

Biofilter chemical analysis sample

	mg/nm3	uncertainty	note
H2S	<0.23		below detection
Amines	<0.23		below detection
NH3	0.11	0.02	
Organic carbon (excluding ch4)	1	0.2	
mercaptin	<0.01		below detection
organic acids	0.037	0.007	
butyric acids	<0.014		below detection
propionic acids	0.018	0.004	
acetic acid	0.019	0.004	
Total VOCs	1.267		

varez *, S. Macé, P. Llabrés Barcelona, Spain, 24 January 2000

Modelled Data from vendor

	wet/0 °C/101.325kPa	dry/20 °C/101.325kPa	Max Condition (1.2x of modeled)	mg/m3	tonne/y	Wet/100 °C/108.418kPa (Actual)
Flow (Nm3/h)	378	403.81				552.53
Flow (Nm3/min)	6.30	6.73				9.21
T (deg C)	0	20				100
P (psig)	1.0	0				0.07
CH4 (%)	1.00%	1.01%	1.2%	7982	28.24	
CO2 (%)	97.33%	98.77%				
O2 (%)	0.19%	0.19%				
N2 (%)	0.02%	0.02%				
H2O (%)	0.46%	0.00%				
H2S (ppm)	1	1	1.2	1.70	6.00E-03	
H2 (%)	-					
Sum	99.00%	100.00%				
Stack diameter (m)	0.108	0.108				0.108
Velocity (m/s)	11.46	12.24				16.75

Calculation Data

0.024054 m³/mol gas @ 20 °C/101.
 34.01 g H₂S/mol H₂S
 16 g CH₄/mol CH₄
 1.2 max condition factor

325kPa

Vendor Data

Stack Height 6.096 m
 Stack diameter 0.4826 m
 Velocity at Actual Conditions 5.700695014 m/s
 Supply gas sulphur content (FortisBC) 15.6 mg/m3
 NOx status

Calculation Data

0.024053778 m3/mol gas @ 20 °C/101.325kPa
 46.01 g NO2/mol NO2
 1.2 max condition factor

Boiler emissions at different capacities

100%	capacity
100%	% operated
30	ppmv NOx
68.861	mg NO2/m3
1.427	tonne/y

vendor information

16000 ft3 per h per million btu	16000 ft3/h/Mmbtu				
corrected to 3% oxygen					
Mmbtu	8				
flow rate 100	2133				
flow rate 87	1856				
flow rate 42	896				
flow	sub 9	sub 30	GM-8 standard	lbmin	
	0.87	7	22	50	1856
	0.42	9	30		896

New submittal values

Hours of Operation =	6570	h/y	Note: operating assumption of 75%				
	Q (m3/min)	v (m/s)	T (deg C)	P	O2	H2O	NOx
Discharge Flow (vendor dry O2 corrected T @ 63.9) @ 87%	52.556	4.79	63.9	101.3	3%	0%	0 0030% (data from vendor)
Discharge Flow (Normal)	45.711	4.16	20.0	101.3	3%	0%	
Discharge Actual	62.567	5.70	63.9	101.3	3%	16%	
	Q (m3/min)	v (m/s)	T (deg C)	P	O2	H2O	NOx
Discharge Flow (Standard @ 63.9) 42%	25.372	2.31	63.9	101.3	3%	0%	0 0000% (data from vendor)
Discharge Flow (Normal) 42%	22.067	2.01	20.0	101.3	3%	0%	
Discharge Actual	30.205	2.75	63.9	101.3	3%	16%	

FLUE GAS PRODUCTS (from Vendor)

CO2	MW	Combustion Products										8 ggs 50 p		Emiss on Data			
		WET					DRY					Flue Gas		SRI			
		ACTUAL (25% excess a)	kg MOLES/HR	LB/HR	kg%	%VOL	%WT	kg MOLES/HR	%VOL	%WT	kg MOLES/HR	%VOL	kg MOLES/HR	%VOL	mg/Nm3	tonne/y	
H2O	18.02	266.32	130.80	4797.78	2176.24	11.66%	7.48%	0.00%	0.00	0.00%	0.00	0.00%	0.01	1.63%	738.33	91.10%	
H2	2.02	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
CO	28.01	1637.90	738.31	4591.94	21880.15	71.26%	71.23%	738.31	80.00%	0.00	738.31	91.00%	0.00	0.00%	0.01	1.63%	
HC	36.46	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
SO2	64.07	0.00	0.01	1.28	0.58	0.00%	0.00%	0.01	0.00%	0.01	0.01	0.00%	0.01	0.001%	0.01	0.001%	
O2	32.00	285.99	139.73	9151.41	4151.03	12.32%	14.28%	139.73	14.18%	0.00	24.29	3.00%	3.66	0.3	0.41%	34.29	3.00%
N2	28.02	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
NO2	46.01	0.07	0.03	3.337236	1.53	0.00%	0.01%	0.03	0.00%	0.03	0.03	0.00%	0.03	0.004%	0.03	0.004%	
CH4	16.04	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
H2	2.02	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
H2S	34.10	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
NO	30.01	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
VOC (spec ated below)	17.03	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
D chlo ometane	84.93	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Methylsulfolatone (M BK)	100.16	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Butanol	72.11	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Acetonitrile	41.05	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Acrylonitrile	53.06	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Methylsulfolatone (MEK)	72.12	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Toluene	92.14	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
n-butylacetate	116.16	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Isopropylalcohol	60.10	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
Acetone	58.08	0.00	0.00	0.00	0.00%	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	0.00	0.00%	
TOTAL		2283.4	1085.8	64099.5	29075.0	100%	100%	915.02	100%	0%	869.58	100%	0.87	100.0%	810.46	100%	

Flue Gas MET MW = 1463.4 AMM/m³
 Flue Gas EXIT FLOW = 415.2189 Sm³/m³
 365.8284 g y SMA/m³
 137.7051 kg d y SMA/m³

Actual Cond t ions
 T = 760 °C
 P = 101.325 kPa

STACK DIAMETER = 1.7 m
 FLUE GAS EXIT VELOCITY = 10.7 m/s

Stand d Cond t ions
 T = 20 °C
 P = 101.325 kPa
 H2O = 0 % VOL
 O2 = 3 % VOL

NO2 MOLES/HR calculation
 0.15 lbs NO2/MMBTU (data F om Fla e vendor)
 0.6 MMBTU/1000 MTS (based ng value of 8 ggs at 60% CH4)
 0.021 MMBTU/m³
 3.34 lbs NO2/h
 46.01 g NO2/m³
 0.07 lbmo/h

GOVERNMENT OF CANADA NATIONAL POLLUTANT RELEASE INVENTORY & LOGS FLARING CALCULATOR

B ggs p odced 1050 Nm³/h
 37086 Nm³/h
 0.024523778 m³/mol gas @ 20 °C/101.325 kPa
 900 h
 1463.4 Am³/m³
 8262.3 Sm³/h

0.1 lbs SO2/h based on
 0.0005 moM³ H2S n gas feed

0.005 moM³ H2S 0.01346 moM³ H2S
 44.84 mol gas/m³ mol gas/m³
 0.00232 mol H2S/m³ 0.005869 mol H2S/m³
 0.0786656 g H2S/m³ 0.2 g H2S/m³
 76.06556 mg H2S/m³ 200 mg H2S/m³

Part 2 and 3 Substance Releases

Substance Name	CAS Number	Emission Factor	EF Units	EF Qual ty	Activity Rate from Input	total Release	Units	to 3 decimals	Units	Concentration	Units
PM10 total	+	0	kg/m ³	U	100	0	kg/h	0.000	kg/y	0.000	mg/m ³

Part 4 Criteria Air Contaminants (CAC) Releases

Substance Name	CAS Number	Emission Factor	EF Units	EF Qual ty	Activity Rate from Input	total Release	Units	to 3 decimals	Units	Concentration	Units
Carbon Monoxide (CO)	630-08-0	0	kg/m ³	U	100	0	tonne/y	0.000	tonne/y	0.000	mg/Nm ³
Sulfur Dioxide (SO2)	7446-08-6	0.0000000	kg/m ³	U	100	0	tonne/y	0.000	tonne/y	0.000	mg/Nm ³
Unsat. of Nitrogen, imp. based on NO2 (NOx)	11104-03-1	0.0004533	kg/m ³	U	100	0.0004533	tonne/y	0.428	tonne/y	0.507	mg/Nm ³
Total Particulate Matter (TPM10)	+	0.0000000	kg/m ³	U	100	0	tonne/y	0.000	tonne/y	0.000	mg/Nm ³
Particulate Matter less than or equal to 10 µm (PM10)	+	0.0000000	kg/m ³	U	100	0	tonne/y	0.000	tonne/y	0.000	mg/Nm ³
Particulate Matter less than or equal to 2.5 µm (PM2.5)	+	0.0000000	kg/m ³	U	100	0	tonne/y	0.000	tonne/y	0.000	mg/Nm ³

*Excluded because of complete combust on

Gas properties from Andion Model

Maximum flow capacity of Ammonia Scrubber (Normal) 161 Nm³/min 185.7143

Actual conditions

T(min) 65 °C
P 101.325 kPa
H₂O content (see calculation below) for actual conditions 25%
Maximum flow capacity of Ammonia Scrubber (Actual) 247 Am³/min
Stack diameter 0.597 m
Discharge velocity at Actual Conditions 14.7 m/s

Exhaust Gas Composition

Water content (saturated at given T and P)	203.92 g H ₂ O/kg dry air	MW of H ₂ O =	18.015 g/mol
Water percent composition	25% VOL-%, Mol-%	MW of dry air	28.965 g/mol
O ₂	16% VOL-%, Mol-%		
N ₂	59% VOL-%, Mol-%		
NH ₃ concentration in discharge	4 mg/Nm ³		
NH ₃ discharge per year	0.34 tonne/y		

Former ES number	Emission Source ES #	EMISSION SOURCE DESCRIPTION	STACK DESCRIPTION	MAXIMUM OPERATING HOURS PER YEAR	Nitrogen Oxides (NOx)	Sulphur Dioxide (SO2)	Volatile Organic Compounds (VOC)	Total Particulate Matter (TPM)	Ammonia (NH3)	Methane (CH4)	Hydrogen Sulphide (H2S)	Elevation (m)
ES07	Base ES01	Reception/pre-treatment building exhaust, biopulper/equalization tank headspace discharging through a biofilter	NA	8760	t/y	t/y	t/y 0.78	t/y	t/y 0.07	t/y	t/y 0.10	18.00 20.03
ES04	ES02	Biogas Upgrading Facility discharging through a stack	vertical up, 45 degrees to horizontal, no rain cap	8760						28.24	6.00E-03	26.00
ES02	ES03	Gas Fired Hot Water Boiler discharging through a stack	vertical up, rain cap	6570	1.43							24.10
ES05	ES04	Emergency Flare System discharging through a stack	vertical up, rain cap	900	1.36	0.523	4.51E-03			7.56	3.52E-03	27.75
ES06	ES05	Ammonia Stripper discharging through a stack	vertical up, <u>no rain cap</u>	8760					0.34			27.75
ES01	FES01	Truck unloading fugitive emissions	NA	5840								
ES03	Deleted on agreement with MV	Anaerobic Digester Pressure Relief Valve										
Total					2.789	0.523	0.781	0.000	0.406	35.80	0.108	40.404

	flare	BUP sys	
H2S		H2S	h2s
	116 m3/min	2.6 m3/min	
	6960 m3/h	156 m3/h	
	600 h/y	8760 h/y	
	50 mg/m3	3 mg/m3	1.5 mg/m3 per
	0.2088 t/y	0.00409968 t/y	

r ppm

Organic Waste VOC 67.2 mg TVOC/m³
 NH₃ 18.1 mg NH₃/m³

Safety factor 1.5
 Building Capture Rate 0 % (conservative)

TVOC emitted 101 mg TVOC/m³
 NH₃ emitted 27 mg NH₃/m³

Estimate of VOCs content in the gas flow sent to the biofilter

The estimate, as a safety factor, was calculated from the estimate emissions of VOCs during aerobic composting of OFW
 Reference: J. Mata-Alvarez, S. Macé, P. Llabrés. 2000. *Anaerobic digestion of organic solid wastes. An overview of res*

Food Waste Inlet (OFW)
 70000 tonnes/y
 191.8 7d/7

Biofilter flow rate
 70,000 m³/h

	Specific load	Load	Inlet gas flow concentration	
Aerobic	(g/t_OFW)	g/d	mg/m ³	%
Pollutants				
Alcohols	283.6	54,389	32.4	48.19%
Ketones	150.4	28,844	17.2	25.56%
Terpenes	82.4	15,803	9.4	14.00%
Esters	52.7	10,107	6.0	8.95%
Organic sulphides	9.3	1,784	1.1	1.58%
Aldehydes	7.5	1,438	0.9	1.27%
Ethers	2.6	499	0.3	0.44%
Total VOCs	588.5	112,863	67.2	100%
NH ₃	158.9	30,474	18.1	
Total emissions	747.4	143,337	85.3	

FW

earch achievements and perspectives. *Bioresource Technology* 74 (2000) 3-16.

Biogas Composition from Andion Models

		Normal, T/P	Dry	Max Unflared Gas Composition
CH4	%v	58.90%	60.00%	15.00%
CO2	%v	37.16%	37.86%	9.46%
N2	%v	1.60%	1.63%	59.66%
O2	%v	0.40%	0.41%	15.85%
H2	%v	0.10%	0.10%	0.03%
H2O	%v	1.84%	0.00%	0.00%
Total		1	1	1
Trace compounds (dry basis)				
H2S	mg/Nm ³		200	50
NH3	mg/Nm ³		5	1.25
VOCs (speciated below)*	mg/Nm ³		239.00	59.75
Dichloromethane	mg/Nm ³		7.85	1.9625
Methylisobutylketone (MIBK)	mg/Nm ³		1.68	0.42
Butanol	mg/Nm ³		9.64	2.41
Acetonitrile	mg/Nm ³		1.76	0.44
Acrylonitrile	mg/Nm ³		6.47	1.6175
Methylethylketone (MEK)	mg/Nm ³		193.00	48.25
Toluene	mg/Nm ³		0.66	0.17
n-butyl acetate	mg/Nm ³		1.58	0.40
Isopropanol	mg/Nm ³		1.97	0.49
Acetone	mg/Nm ³		14.30	3.575

* Speciated VOCs are taken from a biogas facility that digests a mix of food waste that is similar to what is proposed for this Project. The facility was constructed by Andion for Alan SRL, Zinasco, Italy.



Qualified Professional Declaration of Competency

Metro Vancouver Regional District’s Environmental Regulation and Enforcement Division relies on the work of Qualified Professionals¹. With this comes an assumption that professionals who undertake work in relation to Metro Vancouver permits, licences, and bylaws have the knowledge, experience and objectivity necessary to fulfill this role.

1. Name of Qualified Professional Travis Miguez

Title Senior Meteorology and Air Quality Specialist

2. Are you a registered member of a professional association in B.C.? Yes No

Are you a registered member of a professional association elsewhere? Yes No

Name of Association(s): ECO Canada Registration #(s) 23663

3. Brief description of specific professional services that will be provided:

Meteorological and Air Quality consulting services – specifically, conducting an air dispersion
modelling assessment with CALPUFF in accordance with Metro Vancouver and BC MOECC
assessment guidance to support Andion’s Air Permit Application

This declaration of competency is collected under section 26(c) of the *BC Freedom of Information and Protection of Privacy Act* for the purpose of ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure inside or outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact foippa@metrovancouver.org.

Declaration

I am a Qualified Professional with the knowledge, skills and experience to provide expert information, advice and/or recommendations in relation to the specific work described above.

Signature:

Print Name: Travis Miguez

Date signed: 02/25/23

Witnessed by:

Print Name: Aurelien Hospital (Mar.16, 2023)

¹ *Qualified Professional, in relation to a duty or function under MVRD and GVS&DD bylaws, means an individual who*

- a) *is registered in British Columbia with a professional association, is acting under that organization’s code of ethics, and is subject to disciplinary action by that association, and*
- b) *through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.*

Conflict of Interest Disclosure Statement

A Qualified Professional¹ or other Individual providing services to a regulated person for the purpose of that person obtaining a permit, licence or an authorization from Metro Vancouver Regional District, or pursuant to a requirement imposed under the Environmental Management Act or a Bylaw, has a real or perceived conflict of interest when the Qualified Professional/Individual, or their relatives, close associates or personal friends have a financial or other interest in the outcome of the work being performed.

A real or perceived conflict of interest occurs when a Qualified Professional/Individual has:

- a) an ownership interest in the regulated person's business;
- b) an opportunity to influence a decision that leads to financial benefits from the regulated person or their business other than a standard fee for service (e.g. bonuses, stock options, other profit sharing arrangements);
- c) a personal or professional interest in a specific outcome;
- d) the promise of a long term or ongoing business relationship with the regulated person, that is contingent upon a specific outcome of work;
- e) a spouse or other family member who will benefit from a specific outcome; or
- f) any other interest that could be perceived as a threat to the independence or objectivity of the Qualified Professional/Individual in performing a duty or function.

Qualified Professionals/Individuals who work under EMA and its regulations, including MVRD and GVS&DD Bylaws, must take care in the conduct of their work that potential conflicts of interest within their control are avoided or mitigated. Precise rules in conflict of interest are not possible and individuals must rely on guidance of their professional associations (where applicable), their common sense, conscience and sense of personal integrity.

Declaration

Brief description of specific professional services that will be provided:

Meteorological and Air Quality consulting services – specifically, conducting an air dispersion modelling assessment with CALPUFF in accordance with Metro Vancouver and BC MOECC assessment guidance to support Andion's Air Permit Application

I Travis Miguez, as a member of ECO Canada
(Print first name and last name) (Name of Professional Organization)

Declare

(over)

¹ Qualified Professional, in relation to a duty or function under MVRD and GVS&DD bylaws, means an individual who

- a) is registered in British Columbia with a professional association, is acting under that organization's code of ethics, and is subject to disciplinary action by that association, and
- b) through suitable education, experience, accreditation and knowledge, may reasonably be relied on to provide advice within his or her area of expertise, which area of expertise is applicable to the duty or function.

Select one of the following:

Absence from conflict of interest

Other than the standard fee I will receive for my professional services described above, I have no financial or other interest in the outcome of this application.

I further declare that should a conflict of interest arise in the future during the course of this work, I will fully disclose the circumstances in writing and without delay to Metro Vancouver Regional District, Environmental Regulation and Enforcement Division, erring on the side of caution.

Real or perceived conflict of interest

Description and nature of conflict(s):

I will maintain my objectivity, conducting my work in accordance with my Code of Ethics (where applicable) and standards of practice.

In addition, I will take the following steps to mitigate the real or perceived conflict(s) I have disclosed, to ensure the public interest remains paramount:

Further, I acknowledge that this disclosure may be interpreted as a threat to my independence and will be considered by the statutory decision maker accordingly.

This conflict of interest disclosure statement is collected under section 26(c) of the *Freedom of Information and Protection of Privacy Act* for the purpose of supporting transparency of government decision-making and ensuring professional ethics and accountability. By signing and submitting this statement you consent to its publication and its disclosure inside and outside of Canada. This consent is valid from the date submitted and cannot be revoked. If you have any questions about the collection, use or disclosure of your personal information please contact foippa@metrovancover.org.

Signature:

X



Print Name: Travis Miguez

Date signed: 02/25/23

Witnessed by:

X



Print Name: Aurelien Hospital (Mar.16, 2023)

From: [Gerardo Marquez](#)
To: [Ashley Brookes](#)
Cc: [AndionComments](#)
Subject: Semiahmoo RNG - Comments received from Oct 12 - 15 2023
Date: Monday, October 16, 2023 2:30:16 PM
Attachments: [Andion Information Packet \(1\).pdf](#)
[AirPermitApplicationGuidance \(1\).pdf](#)

WARNING: *This email originated from outside of our organization. Do not click any links or open attachments unless you trust the sender and know the content is safe.*

Hello,

Thank you for your comments regarding the proposed Andion Biofuel Facility. We are actively engaged in ensuring compliance with regional, provincial, and federal regulations on multiple fronts.

Andion, as the proponent of the project, appreciates your concerns about your community and your efforts to reach us for more information. Please find attached an information package addressing community queries and concerns, and Metro Vancouver's Guidance for Air Permit Application for your reference.

In the interest of transparency and fostering trust in our facility, we are in the process of organizing a public meeting for those interested. This forum will provide an opportunity to share detailed information, address any concerns, and respond to questions. We kindly request you to complete this form [<https://forms.office.com/r/bgwwFPG3Uc>] with your details, enabling us to extend an invitation to the live informational session once the date is confirmed. The meeting is anticipated to take place at the end of October. Please be aware that the exact date is contingent upon finalizing arrangements with the Semiahmoo Nation and any pertinent oversight bodies expressing interest in participating.

Regards,

Gerardo Marquez

Development Manager

650 – 625 Howe Street Vancouver BC Canada V6C 2T6

E-mail gmarquez@andionglobal.com | **M.** 604.753.7175 | [email disclaimer](#) | andionglobal.com



DRIVEN BY INNOVATION. POWERED BY WASTE



Public Information on the Semiahmoo RNG Facility

PREPARED BY ANDION | SEPTEMBER 2023



A Statement from Semiahmoo First Nation

PREPARED BY ANDION GLOBAL

September 2023



A Statement from Semiahmoo First Nation

Semiahmoo First Nation is extremely excited to be a catalyst in pioneering clean technology in Canada. As stewards of the land, it is our inherent responsibility to protect and preserve our traditional territories. Indigenous Nations are at the forefront of sustainability and environmental best practices in this modern world where waste and greenhouse gas (GHG) emissions play an increasingly detrimental role in all our lives. Through the development of a state-of-the-art Renewable Natural Gas (RNG) facility, Semiahmoo First Nation, along with our partners at Andion North America, are actively addressing the waste management crisis in Metro Vancouver, lowering GHG emissions, and displacing harmful fossil fuels. In doing so, we are also lessening our dependency on big industry and meeting the clean energy needs of FortisBC customers who will receive the RNG we produce, and the Fraser Valley farmers who will benefit from the nutrient-rich bi-product we are able to capture in our process that will go towards more sustainable local farming. As we continue the process of finalizing the project we will be engaged in meaningful dialogue with neighbouring municipalities and information sharing with residents around our sovereign lands.

As of today, the Semiahmoo RNG project is still in the process of development. We have established technical and financial feasibility for the project as well as having taken into consideration various environmental, federal, and regional regulatory requirements required for such a facility. We're pleased to have received federal funding from NRCan as it will help us move the project forward, but we have much to do before we get to a point where we are ready to break ground. We want to ensure our neighbours and those concerned that we are adhering to the appropriate guidelines and environmental standards put forward by Metro Vancouver, the Province of British Columbia, and Indigenous Services Canada among others such as Metro Vancouver.

We chose to develop an RNG facility because, in addition to its environmental benefits, it is a proven technology that can be deployed right away. We've found Andion to be an extremely integral piece to not only the Nation but the neighbouring regions. In coming to this decision, we underwent a process of extreme due diligence before selecting Andion and we experienced their expertise first-hand by visiting live projects in Europe and seeing the benefits of renewable energy, waste reduction, and fossil fuel abatement. We also have spent a great deal of time in performing due diligence in selecting a technology solution that not only is highly reliable and efficient in generating renewable energy but also ensures that the facility can comfortably co-exist within the existing community. Andion has completed over 50 projects in Europe without incident or disruption to the neighbouring communities.

This project addresses the increasing waste management and energy consumption needs of the growing populations on our traditional territory. We want to do our part to minimize waste accumulation in local landfills as well as the trucking and freight of waste that goes into other indigenous territories. We are acting in conjunction with the provincial and federal governments who support the project based on the need to regionalize renewable energy production to reduce carbon emissions and decrease our reliance on fossil fuels.



RNG Quick Facts

PREPARED BY ANDION GLOBAL

September 2023



RNG Quick Facts

RENEWABLE NATURAL GAS (RNG) HIGHLIGHTS

As opposed to Natural Gas, Renewable Natural Gas (RNG) is not derived from fossil fuels. It is created by breaking down existing waste (agriculture, manure, food waste). It is a carbon-negative fuel source, which means it takes more carbon out of the environment than it produces.

Because it diverts waste that would otherwise sit in landfills, Renewable Natural Gas prevents the methane from rotting food from entering the atmosphere (a greenhouse gas that is 80x more damaging than Co₂) and instead captures that methane for clean energy use.

ABOUT ANAEROBIC DIGESTION

Anaerobic digestion (AD) is a natural process where bacteria break down organic material and produce methane (also called Renewable Natural Gas), which can then be used as fuel in place of gas retrieved from harmful extraction methods.

Unlike composting, which allows food to break down in an open environment, AD captures and uses the gases that result from organics decomposing and therefore reduces GHG emissions. With Andion's AD solution, the AD process produces renewable natural gas (methane), which is captured for energy generation. The amount of carbon dioxide that is also produced as part of the AD process is much less than the amount of carbon dioxide produced during composting, thus the AD process results in less GHG emissions than composting.

AD has the potential to reduce global GHG emissions equivalent to 10-13 per cent of the world's current greenhouse gas emissions.

UNDERSTANDING MEASUREMENT OF RNG

In Canada, we measure RNG as GJ – gigajoules. That's one billion joules, which is a measurement of a kg of mass moving at the speed of one meter per second. But it's easier to understand joules when compared with other types of energy that we're familiar with. 1 GJ of renewable natural gas has the same amount of energy as 26.1 litres of fuel oil, 39.2 litres of propane, or 278 kilowatt hours of electricity. Most simply put, one GJ of RNG is equivalent to 4,633 hours of an average 60-watt lightbulb.



Benefits of a Typical RNG Project

PREPARED BY ANDION GLOBAL

September 2023



Benefits of a Typical RNG Project

Below is a sample outline of the benefits to the local economy and the environment of one of our projects.

- The project will eliminate approximately 55,000 tons of greenhouse gas emissions (GHG) every year (that's 1,100,000 over the project lifespan)
- The annual amount of GHG reduced is equivalent to taking 11,800 cars off the roads annually and reducing gasoline consumption by over 22,700,000 liters.
- Diversion of 70,000 tons of organic food waste every year from the civic waste stream, which would otherwise end up in non-sustainable disposal sites like landfills or incinerators.
- The project will help avoid the use of 22,000 tons of chemical fertilizers annually (that's an avoidance of 26,400,000 GJ of fossil fuels)
- The project will generate 3.5M GJ of Renewable Natural Gas, which is equivalent to providing over 37,000 homes with clean energy.

ECONOMIC BENEFITS:

- 14 full time jobs and job training opportunities
- \$50 million+ invested in the project co-owned by First Nations
- First Nation given priority to new jobs created
- Access to new infrastructure and services provided to the First Nation

The project will provide the First Nations community with quality jobs, improved infrastructure and an equity interest. As a result of job creation, training and investment.

The lease is short (25 years) after which the First Nation will own the project entirely and can operate as they see fit. Or, if decommissioning is preferred at that time, we will remove the facility and return the land to its original state.



ENVIRONMENTAL BENEFITS:

- Carbon-negative energy generation
- No disruption of existing waterways
- No use of well water in the project
- No noise or odour impact to surroundings

The project is located on the reserve lands of one of Canada's First Nations, which means that Indigenous Services Canada and the Canadian Environmental Assessment Agency have to approve the appropriate environmental permits and authorizations for the development of the project

WASTE REDUCTION:

- Abatement of nearly 1.5M tons of waste that would otherwise end up in landfills or incinerators
- 30,000 tons from households
- 30,000 tons from commercial/industrial
- 10,000 tons fat/oils/grease

The source material (called feedstock) comes from food waste: food scraps from homes; restaurant food waste including fats/oil/grease; and grocery store expired foods. Partially treated used water that has had the majority of phosphorous and nitrogen removed to the level that it can be discharged to the sewer system will be sent for final treatment at a wastewater treatment plant.

Organic waste (food waste and yard waste) comprises up to 40% of municipal solid waste regionally. Currently, there is less processing capacity in the region than organics that are collected.



Preventing Odours and Air Pollution with Advanced Technologies

PREPARED BY ANDION GLOBAL

September 2023



Preventing Odours and Air Pollution with Advanced Technologies

For the purposes of educating the public on the benefits of RNG today.

Andion's facility takes odour into account right from the design phase of the project.

The entirety of operations will take place within enclosed spaces. There will be no waste/garbage left outside. Bulk food waste is delivered by truck to unloading bays.

The vehicles will reverse into an available truck bay and discharge the organic waste into a dedicated and contained area. Door bays are open only during the tipping process and immediately closed afterwards. Once inside, all buildings are under a vacuum where odour is drawn to the biofilters. All waste is processed within 2 days ensuring minimal time for the organic matter to decompose.



Preventing Odours and Air Pollution with Advanced Technologies

For the purposes of educating the public on the benefits of RNG today.

Biofilters are massive beds (495m² or 5328 ft²) containing mossy wood chips that absorb the majority of odours from the organic waste. Bacterial cultures are grown within the woodchip matrix creating a biofilm that further removes odour and produces an earthy scent.



The biogas that is generated from the Anaerobic Digestion will contain H₂S and VOC's (volatile organic compounds) which will be sent through two cleaning processes: One scrubbing tower to clean out ammonia; and a second other scrubbing tower to clean H₂S before being sent to the biofilter for further reduction.



Understanding the Air Dispersion Modelling Report

The Air Dispersion Modelling Report conducted for this project assess the dispersion and concentration of emissions into the atmosphere of the facility operating under the most conservative conditions. In short; the report looked at where the emissions would go. The modelling adhered to Metro Vancouver standards and guidelines, which is one of the strictest in the world.

The report uses the measurement of "OU," which provides a standard metric to identify the strength of an odour. While an odour assessment in terms of OU provides a quantitative measure to compare between jurisdictions, it does not provide a qualitative description of odour related to nuisance - e.g. hedonic tone. Hedonic tone, or the perception of an odour, is an important odour property for the assessment of annoyances. It doesn't tell us how bad a smell might be, For example, a strong smell from baking cookies would probably be significantly less bothersome than a weaker sewage-like smell.

In the report's Table 5.9, it shows that in the worst weather conditions, there might be up to six times a month when the smell reaches a level of 10 OU near the Hills at Portal Golf Club, next to Highway 99 and the proposed Facility. It is not anticipated that 10 OU will be exceeded at any other receptor or residence.

As for other emissions, Health Canada is checking this report to make sure it's safe for the community. We're answering all their questions to ensure they do not pose any health threat to the community.



Frequently Asked Questions

PREPARED BY ANDION GLOBAL

September 2023



Common Concerns and Questions About the Facility

I LIVE DOWNWIND AND I AM CONCERNED ABOUT THE SMELL.

We hear you – no one wants to have to breathe foul air all day, especially at home. Andion conducted tests to see if smells disperse in the air under the worst-case conditions. We measured the potential impact of these smells. For example, even in the worst-case scenario--which is unlikely--no odour would be detectable for 98% of the time.

According to the data, there will be very few occasions where nearby residents might detect the smell, and most of those instances occur overnight. To handle and minimize any potential odor issues, Andion plans to create an 'Odour Management Plan' to monitor and take appropriate actions.

Andion has completed over 50 projects in Europe, and odour has never been an issue for surrounding communities.

WHAT ABOUT TRAFFIC? WE LIVE IN A QUIET COMMUNITY, I DON'T WANT A FLEET OF TRUCKS DISTURBING THE PEACE.

The traffic count is an average of 20 trucks a day. They will be transporting waste and leaving the facility once the waste has been delivered. An independent third party conducted a comprehensive Technical Due Diligence review of idling and transportation. Their analysis focused on the effects of border traffic, and it revealed that the impact on traffic is minimal. Our truck strategy adopts a one-truck-at-a-time approach during off-peak hours, effectively mitigating potential adverse effects on air quality.

There will be no additional trucks transporting water or natural gas.

The nutrient digestate that will go to the farms in the Fraser Valley will be transported by trucks, but these are included in the total per day (20) as stated above. The same trucks delivering the waste will take away the digestate, a system known as backhauling to reduce the traffic.

The number of trucks is calculated as an average. Different sizes of trucks are expected to deliver the feedstock during operation. There may be more or less depending on the day and time of year, operating at off-peak hours and not on holidays or weekends.

THE LOCATION IS RIGHT NEXT TO THE CANADIAN-US BORDER. IT'S NOT VERY WELCOMING TO VISITORS.

We understand the public's concerns that the facility will look unsightly, especially so close to the land border crossing for visitors coming to Canada. To address this, we have a landscaping budget to ensure the facility is as green as possible, and we will be commissioning a First Nations artist to paint the Anaerobic Digesters with murals. If you've been to Granville Island and seen the cement siloes painted with murals, you'll understand what a difference it makes, and that it actually becomes a landmark rather than an eye sore.



Common Concerns and Questions About the Facility

WHO HAS OVERSIGHT OVER THIS PROJECT? HOW DO WE KNOW THAT IT'S ADHERING TO STRICT ENVIRONMENTAL STANDARDS?

The Environmental Impact Assessment is still under review but will be made available to the public. An air permit and Solid waste license with Metro Vancouver will also be submitted and made available for public notification. In addition to these we have done related studies, such as an Air Dispersion Modelling Report, and an Archaeological study.

The Notice of intent issued by Indigenous services Canada is a part of a larger process for the approvals and permitting of this project. There will be a public notification upon reviewed Environmental impact assessment, the air permit issued by MetroVancouver and the Solid waste discharge license by MV.

WHO IS ANDION AND WHAT CREDENTIALS DO YOU HAVE?

Andion has completed over 50 projects in Europe without incident or disruption to the neighboring communities. This is the first facility in North America to be developed by Andion Global, which has been in operation for over a decade in Europe.

In partnering with Semiahmoo First Nation, Andion underwent a process of extreme due diligence and in doing so demonstrated our expertise first-hand by hosting representatives of the nation at live projects in Europe so that they could see the benefits of renewable energy, waste reduction, and fossil fuel abatement. We also have spent a great deal of time in performing due diligence in selecting a technology solution that not only is highly reliable and efficient in generating renewable energy but also ensures that the facility can comfortably co-exist within the existing community.

WHAT WATER IS USED, AND HOW?

Some water is required for the processing of the organic material. Any water that is not recycled will be treated and discharged into the sewer system. Water, if not recycled is sent to the sewer that is processed by MVRD Anaccis island.

No well water is used in the facility.

WHERE DOES THE GAS GO ONCE IT'S PRODUCED? DO NEW PIPELINES NEED TO BE BUILT?

The advantage of renewable natural gas is that it uses existing infrastructure. In this case, we are partnering with Fortis BC who will purchase the gas that we produce and transport it via their pipelines.

As part of the project development, FortisBC natural gas pipelines will be extended onto the Reservation, delivering for the first time, a new and efficient energy source for the Semiahmoo First Nation to cook and heat their homes. The cost of this development will be borne by the Project, it is not a public expense.



Common Concerns and Questions About the Facility

WHAT MATERIALS ARE BEING USED IN THE PROCESS? WILL THEY BE STORED ON SITE?

The organic material will be sourced from residential communities (compost/food scraps), restaurants (fats, oil, grease and food scraps) and possibly grocery stores or other commercial food sources. No human waste, known as biosolids, will be accepted at this facility. Biohazardous waste from medical facilities and laboratories will not be accepted either.

The facility will process an average of 70,000 tonnes of organic material per year.

ARE THERE ANY BIPRODUCTS?

A nutrient dense digestate that can replace synthetic fertilizers (which are produced using fossil fuels) is a helpful by product of the process.



Renewable Natural Gas, Anaerobic Digestion and a Global Waste Problem

PREPARED BY ANDION GLOBAL

September 2023



RNG, AD and a Global Waste Problem

For the purposes of educating the public on the benefits of RNG today.

Biomethane, or Renewable Natural Gas (RNG) is a proven, clean technology. Known as a drop-in fuel, RNG can directly substitute or complement natural gas without any new infrastructure or retrofitting required. There are more than 300 active operations in Canada already reducing carbon dioxide and methane emissions by 8Mt per year and generating more than 20 PJ of energy.



Biogas & RNG reduces methane emissions (which have 80x the global warming potential of carbon dioxide emissions), offsets fossil fuel use, diverts organic waste, leverages existing infrastructure, and recycles nutrients back into ecosystems. However, Canada is only tapping 13% of its biogas & RNG potential, and there is currently no federal government policy that supports the development of this sector as a renewable energy solution.

This letter aims to provide an objective assessment of hydrogen production (through electrolysis) and highlight the turn-key technologies of RNG. The goal is to promote the understanding and awareness of RNG as a commercially viable and readily available clean energy source for Canada, and encourage its development and use in place of traditional fossil fuels in Canada.



THE ENVIRONMENTAL IMPACT OF ORGANIC WASTE

Organic waste is a global environmental problem. Every year, 1.3 billion tons of food – approximately 1/3 of all food produced in the world for human consumption – is lost or wasted. The resources consumed to produce wasted food have a carbon footprint of approximately 3.3 billion tons of CO₂. There are also harmful environmental consequences to this wasted food disposed of in landfills, as rotting food produces methane, a potent greenhouse gas with 80 times the global warming potential of carbon dioxide. Rain can also carry contaminants from the landfill and this leachate can cause serious environmental problems. Other options for managing food waste include burning but this contributes to air pollution and is highly inefficient as food waste is composed of approximately 75 per cent water and burning requires considerable energy.

THE SOLUTION: ANAEROBIC DIGESTION

The best possible environmental, social, and economic use of this waste is to recover its energy. Anaerobic digestion (AD) is a natural process where bacteria break down organic material and produce biogas, which can then be used as fuel in place of gas retrieved from harmful extraction methods. A report titled “Global Potential of Biogas”, published in July 2019 by the World Biogas Association, stated that “AD has the potential to reduce global GHG emissions by 3,290 to 4,360 Mt CO₂ eq., which is equivalent to 10-13 per cent of the world’s current greenhouse gas emissions. This is achieved through the generation of renewable energy in the form of biogas from the anaerobic digestion of wastes and landfill gas, combined with emissions avoided through the management of organic wastes and avoided fossil fertilizer manufacture, crop burning and deforestation.” This process is becoming increasingly important as awareness of climate change is heightening, encouraging countries to create renewable energy sources. AD is the best alternative for processing food waste and feedstock since food waste has significant energy potential.

THE BIOGAS POTENTIAL FOR A CIRCULAR ECONOMY

Significant market opportunities for new anaerobic digestion plants exist in North America, Italy, and the Nordic region. Many countries are investing in technologies that enable a circular economy to accelerate the transition to a resource-efficient and bio-based recreation of waste while also generating economic, natural and social capital. Canada has introduced 21 federal and provincial programs to attract alternative and renewable energy companies and develop new renewable energy products. In Europe, specifically the Nordic region, governments have announced grants for the achievement of a circular economy mandate. In Italy, a country with large organic waste issues, landfill bans and renewable biogas price incentives are driving the construction of multiple new biogas plants.

READINESS TO DELIVER

Perhaps the most compelling argument for RNG is its immediate deliverability via existing infrastructure—something that does not exist for hydrogen—a feature that enables seamless integration with natural gas pipelines. Biomethane produced from organic waste can be injected directly into natural gas pipelines and delivered to Canadians without the need for system changes or new infrastructure.

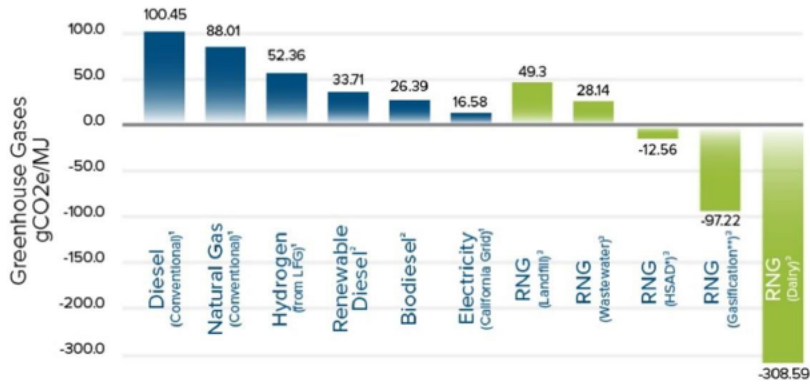
FortisBC already has ambitious goals to include RNG in their pipelines to existing customers. By 2025, FortisBC expects to have RNG contracts in place for roughly 10% of their total natural gas supply.



CI SCORE

RNG offers low carbon intensity scores, making it a favourable option for reducing greenhouse gas emissions. RNG has a significantly lower carbon intensity score compared to conventional natural gas. If produced using renewable energy sources, the carbon intensity score of RNG can be further reduced. The tables below demonstrates this:

CARBON INTENSITY OF KEY TRANSPORTATION FUELS

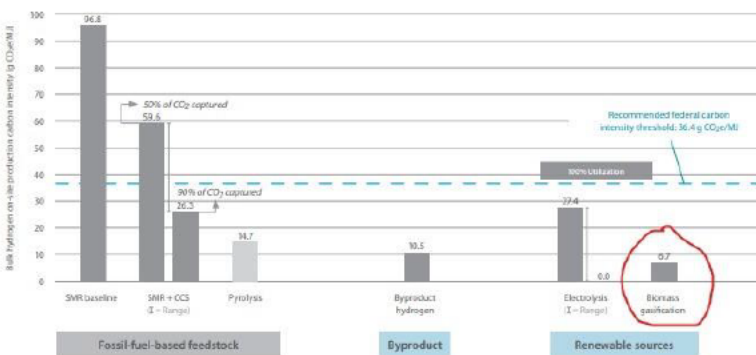


Source: California Air Resources Board Low Carbon Fuel Standard Program Q2 2020 Data
 CI values EER adjusted for HD truck applications
 (1: Lookup table CI values; 2: Average CI values for prior 12 months; 3: Average CI values of registered pathways as of June 2020)
 *HSAD, or High Solid Anaerobic Digestion, converts organics (e.g., food and green waste) into RNG.
 **Gasification is a thermochemical process that converts organics (e.g., forest biomass) into RNG.

In fact, RNG's CI score is calculated as negative—meaning that it reduces more emissions than it creates—as it is created by utilizing existing organic waste through the anaerobic digestion process. This process not only produces clean energy but also mitigates the environmental impact of waste.

By diverting organic waste from landfills and anaerobically digesting it to produce RNG, we effectively reduce the amount of waste that decomposes and releases harmful greenhouse gases into the atmosphere. Methane emissions, which are a natural byproduct of decomposing organic waste, are significantly reduced through this process. Methane is a potent greenhouse gas with approximately 25 times the global warming potential of carbon dioxide, as calculated over a 100 year period. But given the environmental tipping point of our atmosphere, the immediate impacts are more important to take into account, and therefore methane should be calculated as being 80 times more damaging. The reduction of methane emissions is a critical advantage of RNG.

GHG emissions intensity of different hydrogen production methods



The carbon intensity of the production pathways shown above are modelled estimates and use a "cradle-to-gate" life cycle analysis that includes emissions associated with feedstock production, transportation, losses, flaring, land use changes, hydrogen production and carbon capture and storage (if applicable). Data are from the B.C. low carbon fuel standard and 3C Hydrogen Study - Final Report (2020). The actual carbon intensity of a specific hydrogen production project will depend on a number of factors.



NUTRIENTS



The circular economy aspect of RNG production is a crucial factor in its overall sustainability. Through the anaerobic digestion of organic waste, RNG production yields a valuable by-product called digestate. Digestate contains high levels of nitrogen, phosphorus, and other essential nutrients for plant growth.

By utilizing digestate as a fertilizer, we can displace the need for traditional fertilizers that are produced using fossil fuels. Conventional fertilizers contribute to greenhouse gas emissions during their production process. In contrast, digestate-based fertilizers support sustainable agriculture and reduce the environmental impact of traditional fertilizer production.

Furthermore, displacing fossil fuel-based fertilizers with digestate fosters a more sustainable approach to agriculture, reducing our dependence on non-renewable resources and promoting a greener, circular economy.

CONCLUSION

By embracing RNG as a clean energy source, we address multiple environmental challenges simultaneously: mitigating greenhouse gas emissions from organic waste, reducing reliance on fossil fuels, and promoting sustainable resource management practices.



About Andion – Company Overview

PREPARED BY ANDION GLOBAL

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Andion Company Overview

A PROVEN PLATFORM FOR EVERY ORGANICS- TO-RENEWABLE ENERGY PROJECT

ANDION Global (Andion Global Inc.) ANDION Global is an organics-to-renewable energy platform that develops every aspect of biogas projects, from inception to realization. Andion is dedicated to fueling a net-zero future by converting complex and variable organic wastes from a variety of sources – including urban centers and agricultural sites – to make renewable natural gas (RNG). The company's multidisciplinary team has over 20 years of experience delivering more than 50 biogas facilities to date. Headquartered in Vancouver, Canada, Andion Global has operations in North America, Italy and Sweden.



COMPANY HISTORY

Andion has its roots in Italy, where it gained more than 20 years of project expertise and European experience, developed through a combined total of installations at more than 50 Biogas plants worldwide. With ambitions to become a global presence, the company was reinvented and incorporated in 2017, when Andion's current CEO and Andion Global Inc. Founder, Phillip Abrary, saw an opportunity to import this operational legacy, and establish a base to expand the company into the North American market and beyond. Today, Andion has a leading team of mechanical, chemical and process engineers and biologists, as well as a leading executive team, to provide project development, proprietary technology development and engineering, construction and operation services.



Andion Company Overview

A LIST OF ANDION PROJECTS

2022	Italy	Zinasco (PV)	Organic Solid Waste	BIOGAS PLANT
2021	Norway	Skogn	Organic Solid Waste	BIOMETHANE PLANT
2020	Italy	Aprilia (LT)	Organic Solid Waste	BIOMETHANE PLANT
2020	Italy	Rossano (CS)	Organic Solid Waste	BIOMETHANE PLANT
2020	Italy	Cisterna di Latina (LT)	Organic Solid Waste	BIOMETHANE PLANT
2020	Italy	Mozzate (CO)	Organic Solid Waste	BIOGAS PLANT
2019	Italy	Castellazzo (AL)	Organic Solid Waste	BIOMETHANE PLANT
2019	Italy	Mozzate (CO)	Organic Solid Waste	BIOGAS PLANT
2019	Ital	Piemonte	Organic Solid Waste	BIOMETHANE PLANT
2019	Italy	Caluso (TO)	Organic Solid Waste	BIOMETHANE PLANT
2019	Italy	Calcio (BG)	Organic Solid Waste	BIOMETHANE PLANT
2018	Italy	Melfi (PT)	Organic Solid Waste	BIOMETHANE PLANT
2018	Italy	Cairo Montenotte (SV)	Organic Solid Waste	BIOMETHANE PLANT
2016	Italy	Mozzate (CO)	Organic Solid Waste	BIOGAS PLANT
2016	Italy	Cairo Montenotte (SV)	Organic Solid Waste	BIOGAS PLANT
2015	Italy	Voghera (PV)	Organic Solid Waste	BIOGAS PLANT
2013	Argentina	Còrdoba	Organic Solid Waste	BIOGAS PLANT
2012	Italy	Zinasco PV	Organic Solid Waste	BIOGAS PLANT
2012	Italy	BO	Slaughterhouse	BIOGAS PLANT
2010	Belgium	Pittem	Organic Solid Waste	BIOGAS PLANT
2010	Italy	Vescovato CR	Slaughterhouse	BIOGAS PLANT
2008	Italy	Pegognaga MN	Slaughterhouse	BIOGAS PLANT
2008	Italy	Ospedaletto Lodigiano (LO)	Slaughterhouse	BIOGAS PLANT



Thank you

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