Attachment Q

Waste Acceptance Letter of Intent

October 2, 2025

Via Email
Casella Resource Solutions
755 Banfield Road
Suite 201
Portsmouth, New Hampshire 03801-6609
Attn: Clark James, Director of Logistics

RE: Letter of Intent Concerning the Disposal of Offtake by New England Waste Services of ME, Inc. d/b/a Casella Organics, a Maine company with its principal place of business at 755 Banfield Road, Suite 201, Portsmouth, New Hampshire ("***Casella***") to Aries Clean Technologies, LLC, a limited liability corporation with its principal place of business at 4037 Rural Plains Circle, Suite 290 Franklin, TN 37064 ("***Aries***" and together with Casella, a "***Party***" and collectively, the "***Parties***") for the Aries New England Project.

Dear Mr. James:

Subject to Section 2 below, this is a non-binding Letter of Intent ("***LOI***") with respect to certain potential transactions between Casella and Aries regarding the disposal of biochar, spent sorbent and/or dried municipal biosolids ("***Offtake***") from Aries' drying and gasification project to be located in Sanford, Maine and further described in **Exhibit A** (the "***Aries New England Project***").

The Parties agree that except for the provisions identified below as being binding, the matters set forth in this LOI are not intended to and do not constitute a binding agreement of the Parties. Any binding agreement with respect to the transactions contemplated herein will arise only upon the execution of legally binding definitive agreements.

1. Proposed Offtake Disposal Agreement. Casella owns and/or operates landfills in New England that may be permitted to accept biochar, spent sorbent and dried municipal biosolids for disposal, subject to Aries submission of a Special Waste Profile Application and Casella's approval of such Offtake. The Parties are currently interested in entering into a long-term disposal agreement for Offtake from the Aries New England Project.

a. Acceptance of Offtake. Commencing on or about November 2027 [which is the projected commercial operation date of the Aries New England Project] (the "***Commencement Date***"), Casella would accept Offtake at one or more of its landfills. The estimated amount of Offtake accepted for disposal by Casella will be according to the schedule set forth in Exhibit B.

b. Tipping Fee. Aries will pay a disposal fee to Casella on a monthly basis during the term of the Disposal Agreement for Offtake delivered to a Casella landfill (the "***Tipping Fee***"), subject to an increase based upon an annual fee escalator (the Tipping Fee and escalator to be defined in the Disposal Agreement) beginning on the first anniversary of the Commencement Date]. The Tipping Fee shall be negotiated between the parties at a later date.

c. Coordination of Activities. The Disposal Agreement will include protocols for Aries interfacing with Casella on scheduling and delivery of Offtake.

2. Non-Binding LOI. Other than with respect to this Section 2 and Section 4 (Miscellaneous), which shall be binding on the Parties, this LOI does not create any binding commitment or obligation, expressed or implied, on the Parties, is intended as an outline only, and does not purport to summarize all of the terms, conditions, covenants, representations, warranties, and other provisions that would be contained

in the Supply Agreement. Furthermore, the Disposal Agreement and any related ancillary documents are subject to review and approval by each Party's senior management, in its sole discretion, other corporate approvals required by such Party, and execution by the Parties.

3. Cooperation. The Parties shall use commercially reasonable efforts to evaluate the transactions contemplated herein with the goal of commencing good-faith negotiations with respect to the Disposal Agreement.

4. Miscellaneous.

a. Expenses. Casella and Aries each will pay its respective expenses, including outside legal and accounting fees, incident to the negotiation and preparation of this LOI, any definitive agreements, and all other documents prepared in connection herewith or therewith, expenses, fees, and costs associated with pursuing any permits, extensions, or regulatory approvals, if any, and other expenses incident to the consummation of the proposed Agreements (whether or not consummated).

b. Relationship between the Parties. The relationship between the Parties under this LOI is not intended to create a partnership or joint venture under applicable law or to give rise to any fiduciary duties between the Parties or to create any right or authority to act as agent or otherwise on the other Party's behalf or to bind the other Party to agreements with third parties, except as explicitly described herein.

c. Entire Agreement; Amendment. This LOI (including any Exhibits attached hereto, all of which are hereby incorporated by reference) represents the entire agreement between Casella and Aries with respect to the subject matter herein. This LOI may only be amended by written instrument signed by the Parties.

d. Choice of Law and Venue. This LOI shall be governed by, and construed in accordance with, the laws of the State of Maine, without giving effect to any choice or conflict of law provision or rule (whether of the State of Maine or any other jurisdiction) that would cause the application of the laws of any jurisdiction other than the State of Maine. Each Party hereby irrevocably waives, and shall cause its subsidiaries and affiliates to waive, all right to a trial by jury in any action, proceeding or counterclaim arising out of or relating to this LOI or the transactions contemplated hereby. All actions at law or in equity brought by either Party arising out of or in connection with this LOI shall be brought exclusively in a court of competent jurisdiction in the State of New Jersey, and the Parties hereby waive any provision of law providing for a change of venue in such proceedings to any other county.

e. Expiration; Termination; Survival.

i. This LOI shall expire one (1) year from the Commencement date (the "**Term**"), which Term may be extended by mutual written agreement of the Parties.

ii. Following any such expiration or termination, neither Party shall have any further rights, obligations, or duties to the other Party, with the exception of Section 4 which shall survive the expiration or termination of this LOI.

f. No Third-Party Beneficiaries. Nothing herein contained shall be construed to benefit any third party not a signatory to this LOI, and no such party shall have the right to enforce any of the provisions of this LOI.

g. Assignment. Neither Party may assign, delegate or otherwise transfer this LOI to any third party without the prior written consent of the other Party; *provided* that Aries may, without any consent from Casella, assign its rights, interests and delegate its obligations hereunder, in whole or in part, to one or more of its affiliates or to any financing parties.

h. Notices. All notices or other communications required or permitted to be given or delivered under this LOI shall be in writing and will be deemed to have been properly given or delivered (i) when delivered by hand (provided such delivery occurs prior to 5:00 pm, Eastern time); (ii) five (5) days after sent by certified mail, return-receipt requested; (iii) one (1) day after deposit with a nationally recognized overnight delivery service; or (iv) on the day of email transmission (with confirmation of transmission, provided such delivery occurs prior to 5:00 p.m., Eastern time), in each case to the appropriate addresses set forth herein or to such other address as a Party may from time to time designate by written notice to the other Party.

i. Counterparts. This LOI may be executed in one or more counterparts, each of which shall be an original, but all such counterparts shall together constitute but one and the same instrument. A signed copy of this LOI delivered by e-mail or other means of electronic transmission shall be deemed to have the same legal effect as delivery of an original signed copy of this LOI.

[*Signature Pages Follow*]

If the foregoing terms and conditions are acceptable, please so indicate by signing this LOI where indicated below and returning it to my attention.

Aries Clean Technologies, LLC

MRLyons

Name: Mark Lyons
Title: Senior Director, Business Development

Agreed and Accepted:

Casella Organics

Name: A CLARK JAMES
Title: DIR OF LOGISTICS

EXHIBIT A

Aries New England Project Description

The Aries New England Project (the "Project") will be located on Lot 4, Cyro Road in Sanford, Maine. The Project will include sludge dryers capable of processing 409 tons per day of biosolids and one 100 ton per day throughput capacity sludge gasifier. The Project will have an expected total design throughput capacity of 409 tons per day of sludge cake at an average solids content of 22% by weight. The Project will typically operate 24 hours per day, seven days per week. The Project will comply with all applicable federal, state and local environmental laws, regulations, standards and permits.

EXHIBIT B

Estimated Offtake Generation Rates

As used in this LOI "**Offtake**" shall mean waste materials generated by the Aries New England Project.

1. **The following materials are expected to be generated by the Aries New England project at the following generation rates:**

   1.1 **Biochar**: 20-25 tons per day

   1.2 **Spent sorbent**: 10-12 tons per day

   1.3 **Dried municipal biosolids**: 70-100 tons per day (dried biosolids will only require disposal during occasional Aries New England Project gasifier outages)

2. **Exclusion for Offtake that Contain Hazardous Wastes:** Offtake specifically excludes any Hazardous Waste.

   2.1 As used in this LOI, "**Hazardous Waste**" shall mean waste classified as hazardous waste under United States Environmental Protection Agency (USEPA) and/or any other applicable Environmental Laws.

   2.2 "**Environmental Law**" shall mean any federal, state, or local statute, regulation, or ordinance or any judicial or administrative decree or decision, whether now existing or hereinafter enacted, promulgated or issued, with respect to any Hazardous Waste, drinking water, groundwater, wetlands, landfills, open dumps, storage tanks, underground storage tanks, solid waste, wastewater, storm water runoff, waste emissions or wells.

Attachment R

U.S. EPA Determination Letters

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

September 9, 2021

Mr. Dale G. Mullen
Whiteford Taylor Preston, LLP
Two James Center
1021 East Cary Street
Suite 1700
Richmond, Virginia 23219

Email via dmullen@wtplaw.com

Dear Mr. Mullen:

This letter is in response to your letter of September 2, 2020, requesting an applicability determination by the U.S. Environmental Protection Agency (EPA) for a biosolids gasification unit designed by Ecoremedy, LLC (Ecoremedy) and proposed for construction at the wastewater treatment facility of the City of Edmonds, Snohomish County, Washington. Specifically, your letter requested that EPA make a determination regarding applicability of 40 CFR Part 60, Subpart LLLL – Standards of Performance for New Sewage Sludge Incineration Units (SSI NSPS) – to the gasifier system proposed by the City of Edmonds, Washington. You assert that the SSI NSPS does not apply to this facility because it uses gasification, rather than incineration, to treat sewage sludge.

In relevant part, the SSI NSPS apply to sewage sludge incineration units, as defined in Subpart LLLL. 40 CFR 60.4770(b). As discussed in more detail later in this letter, sewage sludge incineration units are units "combusting sewage sludge." Based on the information provided in connection with your request and as discussed later, EPA concludes that the Ecoremedy gasifier unit as proposed would not combust sewage sludge as defined in the pertinent regulations and that the SSI NSPS would not apply to the biosolids gasification unit that is proposed for construction at the wastewater treatment facility of the City of Edmonds, Snohomish County, Washington because the unit would not be an SSI unit as defined in 40 CFR 60.4930. *See* 40 CFR 60.4770(b). This determination is based on the technical information Ecoremedy provided to show the specific gasification unit is not currently covered under the SSI rules.[1] If any changes are made to the unit or the manner by which is operated, it may require a new determination of applicability.

<u>The Ecoremedy Biosolids Gasification Unit</u>

In your September 2, 2020, letter, you assert that SSI units, as defined by Subpart LLLL, must combust sewage sludge. You further assert, again as defined by Subpart LLLL, that sewage sludge does not include gases of any kind. Accordingly, you submit that units that only combust gases do not combust sewage sludge and, therefore, are not SSI units.

With respect to Ecoremedy's gasifier unit, you generally contend that the unit combusts only syngas and that the unit is designed so that no combustion or burning of any solid, semi-solid, or liquid can occur. You emphasize that "only syngas . . . is combusted – not biosolids." You also state that the sludge is converted to syngas in an "oxygen-deficient environment." More specifically describing the gasifier unit you state, in part:

> Ecoremedy's proprietary gasification technology converts biosolids to renewable thermal energy and recycled beneficial products suitable for land application as a stand-alone fertilizer, fertilizer blending agent, soil conditioner, and/or a renewable fuel product. The gasification process begins with a process of converting biosolids into feedstock through a mixing and drying process. The feedstock is entered into the gasifier and brought to a high temperature in an oxygen deficient environment. This causes the feedstock to break down into synthetic gas ("syngas") while ensuring that combustion cannot occur. The gasification process is flameless; the point of gasification is to prevent, not achieve, combustion. Next, residual solids such as ash and char are removed. The syngas is then sent to an oxidizer where air is introduced, combusting the syngas and creating thermal energy. The gases then move through a drum dryer, where they dry incoming biosolids. It then enters a cyclone, which removes particulate matter, before being sent to a wet scrubber for sulfur dioxide and odor treatment.

On September 30, 2020, in response to your request for an applicability determination, EPA requested additional information from Ecoremedy. You sent another letter dated November 17, 2020 (via email), which substantially reiterated your September 2, 2020, description of the gasifier unit. Also, Ecoremedy provided additional information on November 17, 2020, January 19, 2021, February 2, 2021, May 20, 2021, June 9, 2021, June 10, 2021, June 11, 2021, and August 3, 2021.

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[1] As you note in your letter to us, EPA has issued other applicability determinations for similar gasification and/or pyrolysis sources. Importantly, such EPA determinations are specific to the existing SSI NSPS regulations addressing sewage sludge combustion units and do not rule out the applicability of regulations for gasification units issued by EPA in the future. We have limited information on the emissions from gasification and/or pyrolysis sources. For that reason, we have begun a process to request additional information about these processes and their associated emissions. Please refer to https://www.govinfo.gov/content/pkg/FR-2021-09-08/pdf/2021-19390.pdf. This may result in a future standard that could apply to and require additional controls for the facility owned by the City of Edmonds. The information gathering, and potential rulemaking process will likely take some time to complete, and we do not currently have enough information to predict the outcome.

According to information provided by Ecoremedy, the gasification process proposed is a continuously moving, horizontally configured, updraft gasification technology that mimics mini-updraft gasifiers in succession as the fuel bed travels over zones provided with limited air from under the grate. From the supporting information depiction, the gasification system proposed is comprised of a lower and upper chamber correspondingly referred to as the gasifier and oxidizer. There is also a rotary drum dryer physically and operationally connected to the oxidizer and gasifier.

Based on information provided by Ecoremedy on the proposed emission units, we have summarized our understanding of the process as follows.

Sludge is put in the rotary drum dryer. Initially, a natural gas burner is used to provide heated air to the dryer containing the sludge. Dried sludge from the dryer is mixed with wet sludge and fed to the gasifier, where, at least initially, another natural gas burner is used to preheat the gasifier prior to introducing the sludge mix to the chamber. Once heated, the sludge mixture breaks down in the gasifier, which creates its own heat through exothermic reactions and, at this point, the natural gas burner initially used for the gasifier chamber is no longer needed. Along with heat, syngas is also created in the gasifier and the heat and syngas are drawn into the oxidizer. As the heat and syngas from the gasifier enters the oxidizer, enough air is added ("overfire") to combust the syngas to maintain the temperature of the oxidizer chamber without the need for natural gas. Heat is generated in the oxidizer from the combustion of the syngas and the heat is drawn into the dryer to dry the incoming sludge, thereby eliminating the need for the further use of natural gas to externally heat the dryer. Once the process reaches this stage, combustion of the syngas in the oxidizer is self-sustaining and provides the high temperature heat necessary for the gasifier and oxidizer and the rotary drum dryer, without any supplemental heat inputs from natural gas burners.

We understand that, in its initial startup, the rotary drum dryer may be operated independent of the gasifier and oxidizer for several days to produce the needed dried sludge to create the fuel necessary for startup of the gasifier. In addition, the dryer will be operated by itself when the gasifier and oxidizer are down for maintenance. When the dryer is operated by itself, a natural gas burner is used continuously to provide all the heat necessary to dry the incoming sewage sludge.

The additional information provided by Ecoremedy included information relating to your assertion that the gasifier is an "oxygen-deficient environment." The controls on the amount of air in the gasifier include the fan design which limits the total amount of preheated air available for the gasification process and the air distribution system which apportions air by zones according to the processing stage of the organic matter in the sludge. The additional information provided by Ecoremedy also indicated that no overfire air is added to the gasifier. However, overfire air is added to the thermal oxidizer to ensure complete combustion of the syngas in the thermal oxidizer.

Subpart LLLL Applicability Criteria and Determination

Subpart LLLL applies to new "SSI units" that are not otherwise exempt. 40 CFR §60.4770. The request contends that the Ecoremedy gasification unit does not meet the definition of an SSI unit.[2]

"Sewage sludge incineration (SSI) unit" is defined in 40 CFR §60.4930 as:

> an incineration unit combusting sewage sludge for the purpose of reducing the volume of the sewage sludge by removing combustible matter. Sewage sludge incineration unit designs include fluidized bed and multiple hearth. A SSI unit also includes, but is not limited to, the sewage sludge feed system, auxiliary fuel feed system, grate system, flue gas system, waste heat recovery equipment, if any, and bottom ash system. The SSI unit includes all ash handling systems connected to the bottom ash handling system. The combustion unit bottom ash system ends at the truck loading station or similar equipment that transfers the ash to final disposal. The SSI unit does not include air pollution control equipment or the stack.

"Sewage sludge" is defined as:

> solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash generated during the firing of sewage sludge in a sewage sludge incineration unit or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works.

In addition, in publishing the final Subpart LLLL, EPA described an SSI unit as "an enclosed device or devices using controlled flame combustion that burns sewage sludge for the purpose of reducing the volume of sewage sludge by removing combustible matter." 76 FR 15372, 15376 (March 21, 2011).

Based on all the information provided in connection with your request for an applicability determination, we conclude that Subpart LLLL does not apply to the proposed Ecoremedy gasification unit for the City of Edmonds because the unit is not an "SSI unit." It is not an SSI unit, as defined in 40 CFR §60.4930, because it does not combust sewage, also as defined in section 60.4930.

A key part of the definition of sewage sludge describes the state of the material as "solid, semi-solid, or liquid residue." A key part of the definition of an SSI unit, is an incineration unit "combusting sewage sludge." There appears to be no question that the Ecoremedy gasification unit receives sewage sludge. As detailed in your September 2, 2020, letter which states that the unit

[2] The request does not question or dispute that the gasification unit is or would be a new unit. The request also does not make any question or raise any claim about the application of any of the exemptions in 40 CFR § 60.4789. Accordingly, those issues are not addressed here and it is assumed that the gasification unit in question is or would be a new unit and that it is not otherwise exempt.

will be constructed at a wastewater treatment facility in Edmonds, Washington and further explains that "biosolids," after some drying and mixing, are fed into the gasifier. We are satisfied from the information provided that the biosolids to be fed into the gasifier are sewage sludge.

You further describe that the sewage sludge that is fed into the gasifier is not combusted, and, indeed, that "combustion cannot occur." As previously described, an SSI unit is an incineration unit "combusting sewage sludge." Accordingly, if the gasification unit does not combust the sewage sludge that is fed into it, it is not an SSI unit. In general, there are two main phases to the processes that occur after the sewage sludge is fed into the gasifier: first, the sewage sludge in the gasifier is subjected to heat (and also generates heat through an exothermic reaction), where the solid, semi-solid or liquid sludge material is reduced and where gases, including syngas, are generated and second, the syngas is fed from the gasifier into the oxidizer, where it is, as you concede, combusted.

Addressing, first, the second phase of the process—the admitted combustion of the syngas derived from the sewage sludge, we conclude that this phase is not "combusting sewage sludge." Although there is combustion, the syngas derived from the sewage sludge is not, itself, sewage sludge nor a "material derived from sewage sludge." As previously described, sewage sludge is "solid, semi-solid, or liquid residue." The syngas, although derived from sewage sludge, is gaseous, not solid, semi-solid, or liquid. The initial, primary definition of sewage sludge does not mention gases, but only solids, semi-solids or liquids. "Material" derived from solids, semi-solids, and liquids, in our view was intended, here, only to include solids, semi-solids, and liquids, not gases.[3]

As to the first phase of the process the sewage sludge is converted to feedstock through mixing and drying and fed into the gasifier where an oxygen-deficient environment is maintained to prevent combustion. Inside the gasifier, under high-temperature, feedstock decomposes and produces syngas. Ecoremedy has confirmed that the gasification process is flameless, and the gasifier prevents combustion by limiting the airflow into the gasifier.[4] Therefore, we believe the gasifier does not use controlled flame combustion of sewage sludge, and is not an SSI.

This response was coordinated with the Office of General Counsel and the Office of Enforcement and Compliance Assurance and is based on the information provided by Ecoremedy and its counsel. EPA may alter this determination in accordance with applicable regulations, new

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[3] *See*, e.g., applicability determination for Max West Environmental Systems, dated December 19, 2013, which explains EPA's view that "[t]he definition of sewage sludge is expressly limited to the "solid, semisolid, or liquid residue generated during the treatment of domestic sludge in a treatment works.' Since syngas is a gas, and not a solid, semisolid, or liquid, it does not meet the definition of sewage sludge in the SSI EG rule (even though it is derived from sewage sludge)."
https://cfpub.epa.gov/adi/index.cfm?fuseaction=home.dsp_show_file_contents&CFID=126652990&CFTOKEN=98981573&id=FP00004

[4] *See*, preamble to March 21, 2011, final rule which describes an SSI unit as "an enclosed device or devices using controlled flame combustion that burns sewage sludge for the purpose of reducing the volume of sewage sludge by removing combustible matter." *See* 76 FR 15372.

information, or other good cause. If you have any additional questions, please contact Nabanita Modak of my staff, at (919) 541-5572 or by email at: *Modak.Nabanita@epa.gov*..

Sincerely,

Michael Koerber for

Peter Tsirigotis
Director

cc: Dave Mooney, President, Ecoremedy, LLC via email dmooney@ecoremedyllc.com
John Dawson, Engineering Manager, Puget Sound Clean Air Agency via email JohnD@pscleanair.gov

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

DEC 19 2013

OFFICE OF
ENFORCEMENT AND
COMPLIANCE ASSURANCE

Jeff Snyder
Chief Marketing Officer
MaxWest Environmental Systems Incorporated
1485 International Parkway
Suite 1031
Lake Mary, Florida 32746

RE: Request for Determination of Applicability under 40 CFR Part 60, Subpart MMMM - Emissions Guidelines and Compliance Timelines for Existing Sewage Sludge Incineration Units

Dear Mr. Snyder:

This letter is in response to your email of November 7, 2013, in which you inquired on the status of a September 24, 2013, request for applicability submitted on behalf of MaxWest Environmental Systems, Incorporated (MaxWest) by Ms. Bernadette Rappold, of McGuire Woods. Ms. Rappold requested a determination of applicability under 40 CFR Part 60, Subpart MMMM - Emissions Guidelines and Compliance Timelines for Existing Sewage Sludge Incineration Units (SSI EG Rule) for a sewage sludge gasifier located in Sanford, Florida and owned by MaxWest. Your November 7, 2013 email confirms that the McGuire Woods' request for applicability is being made on behalf of MaxWest.

For the reasons stated below, the Environmental Protection Agency (EPA) believes that the neither the MaxWest sewage sludge gasifier nor thermal oxidizer process heater are subject to the SSI EG Rule.

Background

According to the McGuire Woods' request, MaxWest constructed a fixed bed downdraft gasifier for processing biosolids[1] in late 2008. Operation began during September 2009. The original fixed bed downdraft gasifier was replaced with a fluidized bed design; construction on this unit began September 26, 2011[2]. According to information provided in your letter, the current process involves a continuous feed of dried biosolids into the gasifier. The gasifier is operated in an oxygen-starved environment at a temperature of approximately 704 degrees celcius (°C). No flame is applied to the sewage sludge in the gasifier, nor is a flame propogated as a result of the heating. The gasifier produces what is called a synthetic gas or "syngas." Once the syngas exits the gasifier, it is routed through a particulate matter cyclone and then to a process heater and heat exchanger for heat recovery. The

[1] MaxWest provides that the biosolid feed to the gasifier is sewage sludge.
[2] In determining applicability to Subpart MMMM, the EPA used the "commenced construction" dates as provided by MaxWest. In other words, we did not determine if the applicability of Subpart LLLL at Section 60.4775 applies instead.

syngas is combusted in the process heater to generate the heat needed to dry new incoming sludge. The flue gas exiting the process heater and heat exchanger is routed to a baghouse and a wet scrubber.

EPA Response

As means of background, an emissions guideline (such as the SSI EG) does not apply directly to a source. Instead, the emissions guideline applies to Administrators of air quality programs in a state or in a United States protectorate. The emissions guideline directs those Administrators on the content, timing, and requirements for developing a state plan in order to implement the guideline. A state is required to submit a plan for approval to EPA, to implement and enforce the EG, not later than 1 year after EPA promulgates the EG. See U.S.C. §7429(b)(2). If a state has not submitted an approvable plan within two years after the date of promulgation of an EG, then the EPA shall develop, implement and enforce a federal plan. See U.S.C. §7429(b)(3). Emissions guidelines are not enforceable until the EPA approves a state plan (or adopts a federal plan that implements and enforces the guideline), and the state (or federal) plan has become effective. The SSI EG was promulgated on March 21, 2011, and Florida did not submit a state plan for the SSI EG by the March 21, 2012, deadline. See Section 60.5005(b). EPA is currently drafting a proposed federal implementation plan.

For the purposes of this response, we are determining whether MaxWest owns and operates an SSI as that term is defined in the SSI EG Rule, and therefore, whether the SSI Federal Plan would be applicable, once finalized.

According to Section 60.5060, the SSI EG rule applies to SSI units that are constructed on or before October 14, 2010, or modified on or before September 21, 2011.

An SSI unit is defined at Section 60.5250 as:

> . . . an incineration unit combusting sewage sludge for the purpose of reducing the volume of the sewage sludge by removing combustible matter. Sewage sludge incineration unit designs include fluidized bed and multiple hearth. A SSI unit also includes, but is not limited to, the sewage sludge feed system, auxiliary fuel feed system, grate system, flue gas system, waste heat recovery equipment, if any, and bottom ash system. The SSI unit includes all ash handling systems connected to the bottom ash handling system. The combustion unit bottom ash system ends at the truck loading station or similar equipment that transfers the ash to final disposal. The SSI unit does not include air pollution control equipment or the stack.

Sewage sludge is also defined at Section 60.5250 as:

> . . . [a] solid, semi-solid, or liquid residue generated during the treatment of domestic sewage in a treatment works. Sewage sludge includes, but is not limited to, domestic septage; scum or solids removed in primary, secondary, or advanced wastewater treatment processes; and a material derived from sewage sludge. Sewage sludge does not include ash

> generated during the firing of sewage sludge in a sewage sludge incineration unit or grit and screenings generated during preliminary treatment of domestic sewage in a treatment works.

The preamble to March 21, 2011, final rule describes an SSI unit as "an enclosed device or devices using controlled flame combustion that burns sewage sludge for the purpose of reducing the volume of sewage sludge by removing combustible matter." See 76 FR 15372. According to the information provided by MaxWest, no flame is applied or propogated in the gasifier and the gasifier prevents combustion by limiting the air-to-sludge ratio such that combustion cannot occur. Therefore, we do not believe that the gasifier is an SSI, because it does not combust sewage sludge.

With regard to the thermal oxidizer process heater, combustion of the syngas does take place in this unit. The definition of sewage sludge at Section 60.3930 includes "material derived from sewage sludge." According to the information provided by Maxwest, the syngas is derived from sewage sludge through the gasification process. The definition of sewage sludge is expressly limited to the "solid, semisolid, or liquid residue generated during the treatment of domestic sludge in a treatment works." Since syngas is a gas, and not a solid, semisolid, or liquid, it does not meet the definition of sewage sludge in the SSI EG rule (even though it is derived from sewage sludge). Therefore, EPA believes that the combustion of the syngas in MaxWest's thermal oxidizer process heater is not subject to the SSI EG Rule.

On December 7, 2010, EPA issued an applicability determination under 40 CFR 61, Subpart E, for MaxWest's Sanford fixed bed downdraft gasifier and thermal oxidizer process heater. See enclosure. See also Control Number Z130001 at: www.epa.gov/compliance/monitoring/programs/caa/adi.html. EPA promulgated the Part 61 emissions standards in 1975 under the authority of Section 112 (hazardous air pollutants) that existed at that time and prior to the enactment of Section 129 in the 1990 Clean Air Act Amendments. The provisions of the Part 61 regulations continue to apply as described in that determination and are unrelated to the SSI EG rule.

This response was coordinated with the Office of General Counsel, EPA Region 4, and the Office of Air Quality Planning and Standards, and is based on the information provided by MaxWest and counsel. If you have any additional questions, please contact Marcia Mia of my staff, at:
(202) 564-7042 or by email at: mia.marcia@epa.gov.

Sincerely,

Edward J Messina

Edward Messina, Director
Monitoring, Assistance, and Media Programs Division
Office of Compliance

Enclosure

cc: Bernadette Rappold, McGuire Woods
Cameron Prell, McGuire Woods
Lisa Sharp, McGuire Woods

Attachment S

PFAS Stack Test Report (Linden NJ)

Results of the November 19-20, 2024, PFAS Mass Balance Study at the Aries Clean Technologies Biosolids Gasification Facility Located in Linden, New Jersey

Biosolids Gasification Process

Barr Project No. 30201003.00

Prepared for
Aries Clean Technologies

Prepared by
Barr Engineering Co.

April 2025

4300 MarketPointe Drive, Suite 200
Minneapolis, MN 55435
952.832.2600

barr.com

Results of the November 19-20, 2024, PFAS Mass Balance Study at the Aries Clean Technologies Biosolids Gasification Facility Located in Linden, New Jersey

April 2025

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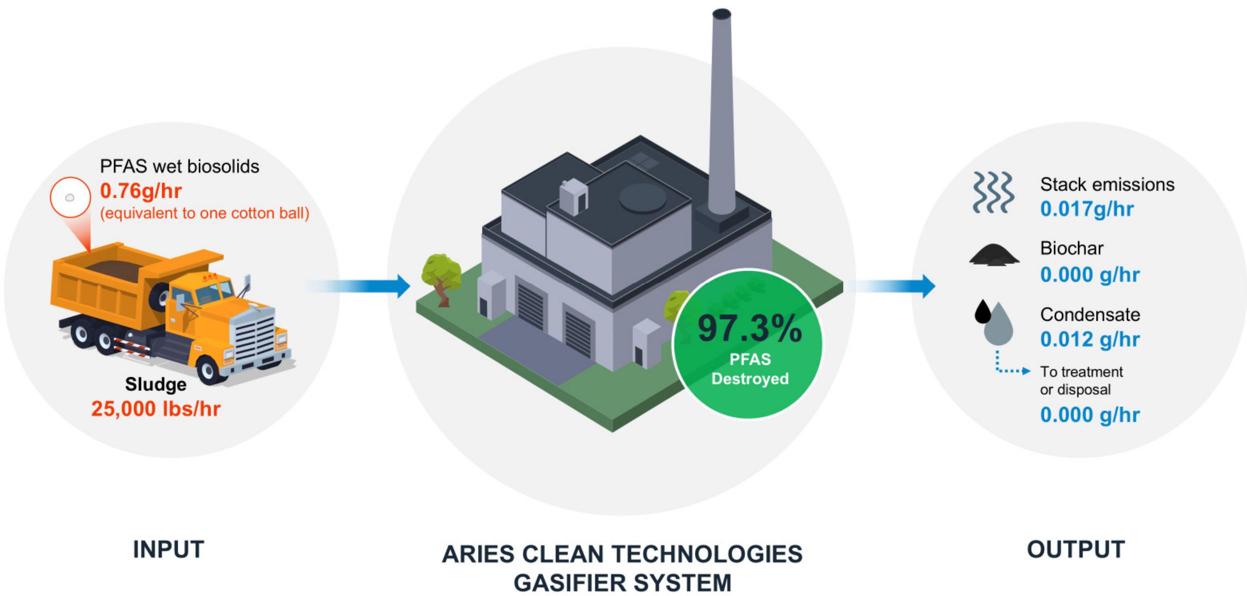
Executive Summary

Aries Clean Technologies (Aries) contracted Barr Engineering Co. (Barr) to perform a mass balance assessment for per- and poly-fluoroalkyl substances (PFAS) compounds at their biosolids gasification facility in Linden, New Jersey which included PFAS emission testing. The information gathered was used to assess PFAS destruction capabilities of the biosolids gasification system. The test was performed on November 19 and 20, 2024 using USEPA Other Test Method 45 (OTM-45) REV1 to measure stack gas concentrations and mass emission rates of PFAS compounds, while EPA Method 1633 and EPA Method 537 was used to measure solids and liquids samples for PFAS.

The information was gathered to assess PFAS destruction of the biosolids gasification system. Process samples were collected by Aries operators for wet biosolids (~20% solids by weight). The facility's influent was, on average, 25,000 pounds per hour of wet biosolids, roughly a single truck of product. As a result of the EPA Method 1633 analysis, the wet biosolids contained 0.76 grams per hour of PFAS, which is the vast majority of the PFAS input to the gasifier process. This is equivalent in mass to a cotton ball of PFAS within the truck or 67 parts per billion (nanogram PFAS/gram wet biosolids).

The results of the test indicated that the Aries Biosolids Gasification process effectively destroys PFAS with as much as 97.3% PFAS destruction and removal efficiency (DRE), which is significant given the low mass of PFAS entering the system. There is potential to increase this DRE to 98.9% upon treatment or disposal of the condensate stream from the dryer system, pending technical and economic evaluations. Continued operation and optimization of the gasification system has the potential to increase the PFAS destruction capabilities of the system. It is reasonable to expect that even greater PFAS destruction can be achieved with continued process optimization. This future performance can be verified with a future stack emission and mass balance test.



1 Introduction

Aries contracted Barr Engineering Co. to perform a mass balance for per- and poly-fluoroalkyl substances (PFAS) compounds including stack emissions testing at their biosolids gasification facility in Linden, New Jersey. PFAS emissions testing and solids/liquids sampling were completed at the facility on November 19 and 20, 2024.

Tim Russell of Barr led the test team on-site. Joel Thornton of Aries assisted with site coordination during the tests while the normal Aries operating staff assisted with testing on-site. A list of project participants is in Appendix H.

The stack testing utilized EPA OTM-45 REV 1 for the determination of PFAS concentrations and mass emission rates. The analyte list includes the 49 compounds listed in the method focused on polar semi-volatile PFAS compounds including a core group of carboxylic and sulfonic acids such as PFOA and PFOS which have potentially significant environmental and health concerns as determined by EPA. The test runs were targeted to collect three dry standard cubic meters (NM^3) (105.9 cubic feet) of stack gas.

Test method quality control (QC) samples were collected including media blanks and a sample train proof blank. The sample train field blank was omitted since clean glassware was utilized for each of the three test runs.

Analytical data qualifiers or flags have been carried through to the final calculated test results. It is important to understand data flagging in the use of these test results. The flags associated with the total sample mass for a single test run may be from one or more of four analytical sample fractions. Additional discussion is provided in Section 4: Stack Test Procedures and Methods.

During each of the three runs, process samples including dry biosolids, biochar, and spent sorbent were collected. One sample each of process quench water and fresh sorbent were also collected. The process samples were analyzed for target PFAS compounds by EPA Method 537 modified. Process samples were also collected by Aries operators for wet biosolids, dry biosolids, and condensate, and analyzed for 40 target PFAS compounds by EPA Method 1633.

OTM-45 Samples were analyzed by the Eurofins Test America (Eurofins) laboratory in Knoxville, Tennessee. Process samples were analyzed by the Eurofins Test America (Eurofins) laboratory in Lancaster, Pennsylvania. Eurofins is a leader in analyzing mixed media samples for PFAS and has been working closely with the EPA Office of Research and Development (EPA ORD) in method development and revision to improve analytical effectiveness and outcomes.

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2 Results

Testing was performed on November 19-20, 2024 with the first test run completed on the 19th and the second and third completed on the 20th. Results of the test runs are summarized in Table 1. Low levels of ten PFAS compounds were measured consistently with one or more sample fractions above the laboratory reporting limit (RL) for all three stack test runs as shown below:

Table 2-1 Measured PFAS Compound Mass Emission Rates – Gasifier Stack

Parameter	Gasifier Stack								
Test Methods EPA 1-4, OTM 45	Run 1		Run 2		Run 3				
Test Date	Date		Date		Date		Average	Flags	Detection Limit
Compound	Lb/hr	Flags	Lb/hr	Flags	Lb/hr	Flags			
Perfluorobutanoic acid (PFBA)	**4.1E-06**	H	**3.6E-06**	H	< **1.8E-06**	J H	< **3.1E-06**	H J	DLL
Perfluoropentanoic acid (PFPeA)	**7.8E-06**	H	**5.6E-06**	H	**2.6E-06**	H	**5.3E-06**	H	ADL
Perfluorohexanoic acid (PFHxA)	**2.6E-05**	B H	**2.1E-05**	B H	**9.0E-06**	B H J	**1.9E-05**	B H J	ADL
Perfluoroheptanoic acid (PFHpA)	**3.3E-06**	B H	**2.2E-06**	B H	**1.1E-06**	J B H	**2.2E-06**	B H J	ADL
Perfluorooctanoic acid (PFOA)	**5.3E-06**	H J x	**5.0E-06**	H x	**1.9E-06**	H J x	**4.1E-06**	H J x	ADL
Perfluorononanoic acid (PFNA)	**1.6E-06**	H J x	**1.2E-06**	H J x	**5.1E-07**	J H x	**1.1E-06**	H J x	ADL
Perfluorodecanoic acid (PFDA)	**1.5E-06**	H J	**1.5E-06**	H J	**5.1E-07**	H	**1.2E-06**	H J	ADL
Perfluoroundecanoic acid (PFUnA)	< **3.3E-07**	J H	**3.4E-07**	H J	**1.1E-07**	J H	< **2.6E-07**	J H	DLL
Perfluorododecanoic acid (PFDoA)	< **1.7E-07**	H	**2.2E-07**	H J	**6.2E-08**	J H	< **1.5E-07**	H J	DLL
Perfluoro-3-methoxypropanoic acid (PFMPA)	< 6.3E-08	H	**2.1E-07**	J H	< **7.7E-08**	H J	< **1.2E-07**	H J	DLL

Note: " < " indicates one or more fractions contributing to the total results are below analytical minimum detection level (MDL)
Bold indicates result or sum of results includes fraction with mass above the analytical reporting limit (RL)
Detection Limit Flags
ADL = Above detection limit, where each fraction has detected amounts of a target compound (9.5.1 OTM-45)
BDL = Below detection limit, where all fractions were at or below the detection limit for a target compound (9.5.2 OTM-45)
DLL = Detection limit limited, where at least one of the fractions is below detection limit and at least one fraction is above the detection limit (9.5.3 OTM-45)

The method analyte list includes 49 PFAS compounds as directed in the test method. Descriptions of the flags applied to the data are provided later in the report and in results Table 1 attached. Compound results in bold indicate that at least one of the OTM-45 sample fractions has a detected mass above the analytical reporting limit (RL). The less than symbol ("<") indicates one or more fractions of the sample fractions did not have mass greater than the analytical minimum detection limit (MDL) for that compound. An analytical reporting limit (RL) is the smallest concentration of an analyte that a laboratory can reliably report in a sample as determined by the method. At present time, there is no established regulatory limit for stack emissions.

Process samples were collected during each of the OTM-45 test runs by Barr personnel with the assistance of Aries operators for biochar, dry biosolids and spent sorbent, Barr collected single samples of fresh sorbent and process (quench) water. Barr stored these process samples separate from the stack test samples prior to submittal to Eurofins for analysis. Aries Operators took single samples of wet biosolids and condensate that were also submitted to Eurofins for analysis. PFAS analytical results of the process samples are provided in Tables 2 and 3 attached.

Barr performed mass balance calculations to assess the PFAS destruction and removal efficiency (DRE) of the gasification system. These results are summarized in Table 2-2.

Table 2-2 PFAS Destruction Removal Efficiency

	Run 1	Run 2	Run 3	Average
PFAS Destruction Removal Efficiency (measured)	95.0%	95.4%	97.3%	95.9%
PFAS Destruction Removal Efficiency (with potential future condensate treatment)	96.6%	97.0%	98.9%	97.5%

The input streams for the mass balance included wet biosolids, process quench water, and fresh sorbent. The output streams comprised spent sorbent, condensate, biochar, and stack emissions. Two evaluations were performed. The first evaluation included all input and output streams, resulting in an average DRE of 95.9% across three test runs. The second evaluation excluded the condensate stream from the outputs, recognizing that it could be treated for PFAS using commercially available technologies before discharge or disposal. This exclusion resulted in an average DRE of 97.5% across three test runs. Future treatment or disposal of the condensate stream will depend on feasibility analyses, both technical and economic.

Tables 4 and 5 attached provide the DRE of individual PFAS compounds with detected mass for the two cases, including and excluding the condensate output stream, respectively. The two PFAS mass balance tables also calculate the DRE of the gasification system for the total detected and summed mass of PFAS of the OTM-45 PFAS target analytes. Figures 1 and 2 attached illustrate the average PFAS mass rate of input and output streams in grams per hour (g/hr).

It was clear at the time of the test that the operation of the gasification system was most optimized in test run 3 as compared to the two previous runs. Test run 3 is most representative of the system operating at design conditions. Operating temperatures were highest during test run 3 as shown in the measured stack gas temperatures shown in Table 1 attached. A review of the process operating data in Appendix E shows production of a richer syngas from the gasifier with increased concentrations of hydrogen, methane and carbon monoxide during test run 3 implying more optimal operating conditions. The highest calculated PFAS DRE was 97.3% during test run 3 . Continued process runtime and optimization efforts have the potential to increase the PFAS destruction and removal efficiency.

3 Process Description

The Aries facility processes waste and provides waste management solutions through reduction of biosolids. The material receiving area of the facility involves the receipt and unloading of third-party biosolids. Wet biosolids are received by truck and transferred to enclosed storage tanks ready for introduction to the Aries system. The biosolids storage tanks are sized for storage of two days of material. The biosolids are then sent to the biosolids drying area which includes a 2-train drying system for drying of the wet biosolids from ~18-22% solids to 90% solids by weight, suitable for feeding to the gasification system. Two parallel rotary drum dryer trains are used in the facility using the thermal energy generated from the gasification process to dry the biosolids.

The fluidized bed gasifier is Aries proprietary technology. It is a refractory lined steel unit in which gasification reactions take place. During gasification, a controlled amount of heat is applied to the biosolids in an oxygen-starved environment operating at approximately 1,250°F. The biosolids are converted to molecules of methane, carbon monoxide, hydrogen, and other minor species to form a low energy producer gas. The residual solids, known as biochar and consisting of elemental carbon and ash, are elutriated through the top of the gasifier and captured in a cyclone. Air is injected into the bottom of the gasifier and serves to fluidize the bed of sand. Thermal decomposition of the carbonaceous fraction in the biosolids provides the heat for the gasification reactions and increases the gas flow through the gasifier.

From the gasifier, the producer gas is passed through the cyclone to remove entrained biochar. Approximately 5% of the total biosolids mass after gasification remains as biochar which becomes a value-added product that can be used as an ingredient in concrete. The gas flows through a duct from the cyclone to the thermal oxidizer where it is combusted and sent to heat exchangers that recover the thermal energy to transfer back to the dryers. The thermal oxidizer is designed for an operating temperature of 1,800°F with a residence time of at least 1 second.

An air emissions control system is used to reduce the NOx, SOx, HCl, and particulate emissions. The emission control equipment eliminates 99% of particulate matter (PM) and greater than 95% NOx, and SOx from the flue gas. The equipment consists of an enclosed Selective Catalytic Reduction system (SCR), dry sorbent injection, and a ceramic filter house. An induction fan installed on the downstream side of emissions control system provides a continuous induced flow of air within the flue gas duct work and ancillary emissions control equipment. The exhaust or discharge side of the induction fan is connected directly to the system exhaust stack.

4 Stack Testing Procedures and Methods

Testing was conducted from test ports that meet the test location criteria of Method 1. Drawings of the test port and sample point location are provided in Figures 3 and 4 attached.

Table 4-1 EPA Method 1 Acceptability Criteria

Location	Diameters to Upstream Disturbances	Diameters to Downstream Disturbances	Number of Ports	Number of Points	Average Yaw Angle, Degrees
Gasifier Stack	7.9	12.4	2	12	15

Method 2 was performed in conjunction with the OTM 45 PFAS method to determine stack air velocity and volumetric flowrate. An S-type pitot with a calibration of 0.84 is part of the sample probe assembly and was used to measure the stack gas velocity pressures with an oil manometer.

Stack gas oxygen and carbon dioxide concentrations were determined in accordance with EPA Method Modified 3A concurrent with the OTM-45 test. Bag samples were collected at a constant rate in a 10-liter Tedlar bag and analyzed after each run. A Quantek Model Q22 electrochemical oxygen analyzer and infrared carbon dioxide analyzer was used to determine concentrations.

Sample gas moisture content was determined by Method 4 procedures in conjunction with OTM 45. The moisture content determined at the Gasifier Stack followed Method 4.

PFAS concentrations and emission rates were determined following OTM-45 REV1 Measurement of Selected Per- and Polyfluorinated Alkyl Substances from Stationary Sources. Sample train glassware preparations followed the method including the baking procedure. Openings of cleaned glassware were covered with rinsed aluminum foil and placed in plastic sealed bags for transport to the test site. Eurofins laboratory provided the spiked XAD traps and the filter media, recovery solvent, screened de-ionized water and sample bottles.

Sample impinger trains were assembled in Barr's laboratory trailer prior to each test run, with complete train assembly performed at the test location. All openings of the train were covered with rinsed aluminum foil until connected to avoid contamination.

OTM-45 sample train recovery was completed in Barr's clean space in the laboratory trailer following the method procedures. Samples containers were stored in sealed plastic bags on ice in coolers until custody was transferred to the analytical laboratory.

QA samples were collected as described in the method which included a field media sampling blanks and a sample train proof blank. The sample train field blank was omitted as clean, unused glassware was used for all three runs.

All OTM-45 samples and process samples were transferred to the Eurofins Environment Testing (Eurofins) laboratory in Lancaster, Pennsylvania. OTM-45 samples were than couriered to the Eurofins Knoxville, Tennessee laboratory for analysis.

The OTM-45 samples were extracted and analyzed by Eurofins using their confidential standard operating procedures (SOP) KNOX-OP-0026 and KNOX-LC-0007. The results are reported in multiple laboratory reports.

- Eurofins Report 140-39657-1_REV1
- Eurofins Report 140-39662-1_REV1 OTM 45 QC Samples
- Eurofins Report 410-197832-1_REV1 Process Samples Results
- Eurofins Report 410-198490-1 Process Samples Results

Appendix C provides Barr's PFAS Laboratory Data Evaluation for the OTM 45 samples and the process sample reports. The analytical laboratory Level 4 and Level 2 reports are provided in Appendix D.

The OTM-45 sample analysis results in reporting of four discreet fractions of a PFAS sample train. Fraction 1 is the filter and probe rinse, Fraction 2 is the front sorbent trap (XAD and glassware rinses), Fraction 3 is the impinger catch and rinses, and Fraction 4 is the backup sorbent trap used to evaluate sample breakthrough. Compound sample mass is reported as the sum of the detected mass above the MDL or results at the minimum detection level (MDL) when applicable. The minimum detection limit is the lowest concentration of an analyte that can be reliably detected.

Barr has summarized the analytical results to combine the sample train detected mass fractions and mass reported at the MDL for each test run. Barr's data summaries include the prescribed OTM-45 flags regarding compound detections in the sample media, proof train blanks. These summaries are in Appendix C. The qualifiers and flags used in the summary include the project qualifiers and the laboratory assigned qualifiers. Qualifiers are applied to the total mass determined for the individual compound. Subsequent calculated results retain all qualifiers applied in the laboratory summaries. In addition, notation has been added to each run total pollutant mass as well as the test average calculated concentrations and mass emissions rates which indicate the nature of the result regarding laboratory MDL. The assignment of ADL (above detection limit) to a particular result indicates all fractions contributing to the total were reported above the MDL. Assignment of BDL (below detection limit) to a particular result indicates all fractions contributing to the total were below the MDL. Application of DLL is used to indicate there is a mix of detected masses and masses reported at the MDL contributing to the total.

The list of project qualifiers includes:

Detection Limit Flags

ADL = Above detection limit, where each fraction has detected amounts of a target compound (9.5.1 OTM-45)

BDL = Below detection limit, where all fractions were at or below the detection limit for a target compound (9.5.2 OTM-45)

DLL = Detection limit limited, where at least one of the fractions is below detection limit and at least one fraction is above the detection limit (9.5.3 OTM-45)

< = indicates values below minimum detection level (MDL)

A = >10% breakthrough to backup trap, mass included

Q = potential contamination in breakthrough trap, mass not included (9.1.6 OTM-45)

X = compound was above MDL in FSMB

Y = Proof Blank results is > 10% of total run compound mass

The list of analytical qualifiers includes:

*- = LCS and/or LCSD is outside acceptance limits, low biased.
*+ = LCS and/or LCSD is outside acceptance limits, high biased.
*1 = LCS/LCSD RPD exceeds control limits.
B = Compound was found in blank and sample.
H= Sample was prepped or analyzed beyond the specified holding time.
I = Value is EMPC (estimated maximum possible concentration).
J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

It is important to note that Method OTM-45REV 1 is a draft method under evaluation as described by the EPA method. The analytical results provided are a product of the sampling method and standard operating procedures established by the laboratory utilized for the analysis. There are ongoing development efforts to update OTM-45 to address issues with analytical performance.

5 Conclusion

Given the mass balance results of the testing at the Aries Linden facility, it appears that Aries can achieve effective PFAS destruction and removal with their gasification system at levels up to 97.3%. It is reasonable to expect that even greater PFAS destruction can be achieved with continued process optimization. There is also potential to improve removal by treating the condensate stream for PFAS, which may be implemented in the future, pending technical and economic evaluations. This conclusion can be verified with further stack emission and mass balance results obtained during facility operations at the design standard.

Tables

TABLE 1

EPA OTM - 45 TEST RESULTS SUMMARY

Gasifier Stack

Parameter	Run 1	Run 2	Run 3	Average
Test Date	11/19/2024	11/20/2024	11/20/2024	---
Test Period	1725 - 1835	935 - 1138	1143 - 1336	---
Test Duration, min	70	120	110	100
Average Stack Temperature, °F	273	393	423	363
Average Moisture Content, %V/V	15.5	15.4	16.1	15.7
Air Flow Rate				
acfm	40,300	48,700	50,500	46,500
scfm	29,000	30,100	30,100	29,700
dscfm	24,500	25,400	25,300	25,100
Sample Volume				
acf	60.70	106.30	98.12	88.37
dscf	60.03	106.26	97.17	87.82
dscm	1.70	3.01	2.75	2.49
Isokinetic Variation, %	101.4	100.8	101.2	101.1

TABLE 1 Continued

EPA OTM - 45 TEST RESULTS SUMMARY

Gasifier Stack

Pollutant Concentration, lb/dscf	Run 1	Flag	Detection Level	Run 2	Flag	Detection Level	Run 3	Flag	Detection Level	Average	Flag	Detection Level
Perfluorobutanoic acid (PFBA)	**2.8E-12**	H	ADL	**2.3E-12**	H	ADL	< **1.2E-12**	J H	DLL	< **2.1E-12**	H J	DLL
Perfluoropentanoic acid (PFPeA)	**5.3E-12**	H	ADL	**3.7E-12**	H	ADL	**1.7E-12**	H	ADL	**3.6E-12**	H	ADL
Perfluorohexanoic acid (PFHxA)	**1.8E-11**	B H	ADL	**1.4E-11**	B H	ADL	**5.9E-12**	B H J	ADL	**1.3E-11**	B H J	ADL
Perfluoroheptanoic acid (PFHpA)	**2.3E-12**	B H	ADL	**1.5E-12**	B H	ADL	**7.1E-13**	J B H	ADL	**1.5E-12**	B H J	ADL
Perfluorooctanoic acid (PFOA)	**3.6E-12**	H J x	ADL	**3.3E-12**	H x	ADL	**1.3E-12**	H J x	ADL	**2.7E-12**	H J x	ADL
Perfluorononanoic acid (PFNA)	**1.1E-12**	H J x	ADL	**7.8E-13**	H J x	ADL	**3.4E-13**	J H x	ADL	**7.4E-13**	H J x	ADL
Perfluorodecanoic acid (PFDA)	**1.0E-12**	H J	ADL	**9.7E-13**	H J	ADL	**3.4E-13**	H	ADL	**7.8E-13**	H J	ADL
Perfluoroundecanoic acid (PFUnA)	< **2.3E-13**	J H	DLL	**2.2E-13**	H J	ADL	**7.3E-14**	J H	ADL	< **1.7E-13**	J H	DLL
Perfluorododecanoic acid (PFDoA)	< **1.1E-13**	H	DLL	**1.4E-13**	H J	ADL	**4.1E-14**	J H	ADL	< **9.9E-14**	H J	DLL
Perfluorotridecanoic acid (PFTriA)	< 3.4E-14	J *+ H	DLL	< 4.0E-14	J *+ H	DLL	< 1.3E-14	*+ H	BDL	< 2.9E-14	J *+ H	DLL
Perfluorotetradecanoic acid (PFTeA)	< 3.1E-14	H	BDL	< 4.2E-14	J H	DLL	< 1.8E-14	J H	DLL	< 3.0E-14	H J	DLL
Perfluorobutanesulfonic acid (PFBS)	< 9.3E-14	H J I	DLL	< 4.1E-14	H	BDL	< 3.4E-14	H	BDL	< 5.6E-14	H J I	DLL
Perfluorohexanesulfonic acid (PFHxS)	< 1.7E-14	H	BDL	< 2.1E-14	H	BDL	< 8.8E-15	H	BDL	< 1.5E-14	H	BDL
Perfluoroheptanesulfonic acid (PFHpS)	< 3.3E-14	H *+	BDL	< 4.3E-14	H *+	BDL	< 1.9E-14	H *+	BDL	< 3.2E-14	H *+	BDL
Perfluorooctanesulfonic acid (PFOS)	< 5.1E-14	H J	DLL	< 4.1E-14	J I H	DLL	< 2.8E-14	J I H	DLL	< 4.0E-14	H J I	DLL
Perfluorodecanesulfonic acid (PFDS)	< 2.6E-14	H *-	BDL	< 3.1E-14	H *-	BDL	< 1.5E-14	H *-	BDL	< 2.4E-14	H *-	BDL
Perfluorooctanesulfonamide (FOSA)	< 2.0E-14	H	BDL	< 2.3E-14	H	BDL	< 1.1E-14	H	BDL	< 1.8E-14	H	BDL
Perfluoropentanesulfonic acid (PFPeS)	< 1.5E-14	H	BDL	< 2.0E-14	H	BDL	< 7.5E-15	H	BDL	< 1.4E-14	H	BDL
Perfluorononanesulfonic acid (PFNS)	< 1.7E-14	H *-	BDL	< 1.6E-14	H *-	BDL	< 8.1E-15	H *-	BDL	< 1.3E-14	H *-	BDL
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	< 2.4E-14	H	BDL	< 3.5E-14	H	BDL	< 1.3E-14	H	BDL	< 2.4E-14	H	BDL
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	< 2.3E-14	H	BDL	< 2.7E-14	H	BDL	< 1.2E-14	H	BDL	< 2.1E-14	H	BDL
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	< 1.4E-14	H	BDL	< 1.9E-14	H	BDL	< 7.5E-15	H	BDL	< 1.4E-14	H	BDL
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	< 3.2E-13	H	BDL	< 1.6E-13	H	BDL	< 1.1E-13	H	BDL	< 2.0E-13	H	BDL
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	< 2.5E-14	H	BDL	< 4.1E-14	H	BDL	< 1.4E-14	H	BDL	< 2.7E-14	H	BDL
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	< 4.6E-13	H J x	DLL	< 2.1E-13	H x	BDL	< 1.7E-13	H J x	DLL	< 2.8E-13	H J x	DLL
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	< 1.6E-14	H	BDL	< 2.2E-14	H	BDL	< 8.7E-15	H	BDL	< 1.6E-14	H	BDL
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	< 3.3E-14	H *-	BDL	< 3.1E-14	H *-	BDL	< 1.7E-14	H *-	BDL	< 2.7E-14	H *-	BDL
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	< 6.1E-14	H *+	BDL	< 6.4E-14	H *+	BDL	< 3.6E-14	H *+	BDL	< 5.4E-14	H *+	BDL
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	< 4.0E-14	H *1	BDL	< 4.1E-14	H *1	BDL	< 1.9E-14	H *1	BDL	< 3.3E-14	H *1	BDL
2-(N-ethylperfluoro-1-octanesulfonamido) ethanol	< 2.8E-14	H	BDL	< 3.0E-14	H	BDL	< 1.6E-14	H	BDL	< 2.5E-14	H	BDL
Perfluoro-n-octadecanoic acid (PFODA)	< 3.1E-14	H	BDL	< 4.3E-14	H	BDL	< 1.6E-14	H	BDL	< 3.0E-14	H	BDL
2-(N-methylperfluoro-1-octanesulfonamido) ethanol	< 3.8E-13	J H	DLL	< 1.5E-13	J H	DLL	< 1.2E-13	J H	DLL	< 2.2E-13	J H	DLL
N-methylperfluorooctane sulfonamide (NMeFOSA)	< 3.0E-14	H	BDL	< 3.3E-14	H	BDL	< 1.6E-14	H	BDL	< 2.7E-14	H	BDL
N-ethylperfluorooctane sulfonamide (NEtFOSA)	< 3.3E-14	H	BDL	< 4.7E-14	H	BDL	< 1.9E-14	H	BDL	< 3.3E-14	H	BDL
Perfluoro-n-hexadecanoic acid (PFHxDA)	< 3.8E-14	H	BDL	< 4.9E-14	H	BDL	< 1.9E-14	H	BDL	< 3.5E-14	H	BDL
Perfluorododecanesulfonic acid (PFDoS)	< 3.5E-14	H *-	BDL	< 3.6E-14	H *-	BDL	< 2.0E-14	H *-	BDL	< 3.0E-14	H *-	BDL
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	< 2.9E-14	H	BDL	< 4.6E-14	H	BDL	< 1.6E-14	H	BDL	< 3.0E-14	H	BDL
10:2 Fluorotelomer carboxylic acid	< 8.7E-14	H	BDL	< 1.1E-13	H	BDL	< 4.8E-14	H	BDL	< 8.2E-14	H	BDL
6:2 Fluorotelomer carboxylic acid	< 8.0E-14	H	BDL	< 1.1E-13	H	BDL	< 4.3E-14	H	BDL	< 7.6E-14	H	BDL
7:3 Fluorotelomer carboxylic acid	< 5.4E-14	*+ H	BDL	< 6.9E-14	*+ H	BDL	< 2.8E-14	*+ H	BDL	< 5.0E-14	*+ H	BDL
6:2 Fluorotelemer unsaturated acid	< 2.1E-14	H	BDL	< 2.9E-14	H	BDL	< 1.1E-14	H	BDL	< 2.0E-14	H	BDL
8:2 Fluorotelomer carboxylic acid	< 7.1E-14	H	BDL	< 1.1E-13	H	BDL	< 4.0E-14	H	BDL	< 7.3E-14	H	BDL
8:2 Fluorotelemer unsaturated acid	< 3.6E-14	H	BDL	< 6.2E-14	H	BDL	< 2.0E-14	H	BDL	< 3.9E-14	H	BDL
5:3 Fluorotelomer carboxylic acid	< 7.1E-14	*+ J H	DLL	< 9.9E-14	*+ H	BDL	< 3.6E-14	*+ H	BDL	< 6.9E-14	*+ J H	DLL
3-Perfluoropropylpropanoic acid	< 4.8E-14	H	BDL	< 7.2E-14	H	BDL	< 2.6E-14	H	BDL	< 4.8E-14	H	BDL
Perfluoro-3-methoxypropanoic acid (PFMPA)	< 4.3E-14	H	BDL	**1.4E-13**	J H	ADL	< **5.1E-14**	H J	DLL	< **7.7E-14**	H J	DLL
Perfluoro-4-methoxybutanoic acid (PFMBA)	< 3.3E-14	H	BDL	< 6.3E-14	J H	DLL	< 1.8E-14	H	BDL	< 3.8E-14	H J	DLL
Perfluoro-4-ethylcyclohexanesulfonic acid	< 3.6E-14	*+ H	BDL	< 5.2E-14	*+ H	BDL	< 1.9E-14	*+ H	BDL	< 3.6E-14	*+ H	BDL
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	< 2.3E-14	H	BDL	< 3.9E-14	H	BDL	< 1.3E-14	H	BDL	< 2.5E-14	H	BDL

TABLE 1 Continued

EPA OTM - 45 TEST RESULTS SUMMARY

Gasifier Stack

Pollutant Emission Rate, lb/hr	Run 1	Flag	Detection Level	Run 2	Flag	Detection Level	Run 3	Flag	Detection Level	Average	Flag	Detection Level
Perfluorobutanoic acid (PFBA)	**4.1E-06**	H	ADL	**3.6E-06**	H	ADL	< **1.8E-06**	J H	DLL	< **3.1E-06**	H J	DLL
Perfluoropentanoic acid (PFPeA)	**7.8E-06**	H	ADL	**5.6E-06**	H	ADL	**2.6E-06**	H	ADL	**5.3E-06**	H	ADL
Perfluorohexanoic acid (PFHxA)	**2.6E-05**	B H	ADL	**2.1E-05**	B H	ADL	**9.0E-06**	B H J	ADL	**1.9E-05**	B H J	ADL
Perfluoroheptanoic acid (PFHpA)	**3.3E-06**	B H	ADL	**2.2E-06**	B H	ADL	**1.1E-06**	J B H	ADL	**2.2E-06**	B H J	ADL
Perfluorooctanoic acid (PFOA)	**5.3E-06**	H J x	ADL	**5.0E-06**	H x	ADL	**1.9E-06**	H J x	ADL	**4.1E-06**	H J x	ADL
Perfluorononanoic acid (PFNA)	**1.6E-06**	H J x	ADL	**1.2E-06**	H J x	ADL	**5.1E-07**	J H x	ADL	**1.1E-06**	H J x	ADL
Perfluorodecanoic acid (PFDA)	**1.5E-06**	H J	ADL	**1.5E-06**	H J	ADL	**5.1E-07**	H	ADL	**1.2E-06**	H J	ADL
Perfluoroundecanoic acid (PFUnA)	< **3.3E-07**	J H	DLL	**3.4E-07**	H J	ADL	**1.1E-07**	J H	ADL	< **2.6E-07**	J H	DLL
Perfluorododecanoic acid (PFDoA)	< **1.7E-07**	H	DLL	**2.2E-07**	H J	ADL	**6.2E-08**	J H	ADL	< **1.5E-07**	H J	DLL
Perfluorotridecanoic acid (PFTriA)	< 5.0E-08	J *+ H	DLL	< 6.1E-08	J *+ H	DLL	< 2.0E-08	*+ H	BDL	< 4.4E-08	J *+ H	DLL
Perfluorotetradecanoic acid (PFTeA)	< 4.6E-08	H	BDL	< 6.4E-08	J H	DLL	< 2.7E-08	J H	DLL	< 4.6E-08	H J	DLL
Perfluorobutanesulfonic acid (PFBS)	< 1.4E-07	H J I	DLL	< 6.3E-08	H	BDL	< 5.1E-08	H	BDL	< 8.4E-08	H J I	DLL
Perfluorohexanesulfonic acid (PFHxS)	< 2.5E-08	H	BDL	< 3.1E-08	H	BDL	< 1.3E-08	H	BDL	< 2.3E-08	H	BDL
Perfluoroheptanesulfonic acid (PFHpS)	< 4.8E-08	H *+	BDL	< 6.5E-08	H *+	BDL	< 2.9E-08	H *+	BDL	< 4.7E-08	H *+	BDL
Perfluorooctanesulfonic acid (PFOS)	< 7.5E-08	H J	DLL	< 6.3E-08	J I H	DLL	< 4.2E-08	J I H	DLL	< 6.0E-08	H J I	DLL
Perfluorodecanesulfonic acid (PFDS)	< 3.8E-08	H *-	BDL	< 4.8E-08	H *-	BDL	< 2.2E-08	H *-	BDL	< 3.6E-08	H *-	BDL
Perfluorooctanesulfonamide (FOSA)	< 3.0E-08	H	BDL	< 3.5E-08	H	BDL	< 1.7E-08	H	BDL	< 2.7E-08	H	BDL
Perfluoropentanesulfonic acid (PFPeS)	< 2.3E-08	H	BDL	< 3.1E-08	H	BDL	< 1.1E-08	H	BDL	< 2.1E-08	H	BDL
Perfluorononanesulfonic acid (PFNS)	< 2.5E-08	H *-	BDL	< 2.4E-08	H *-	BDL	< 1.2E-08	H *-	BDL	< 2.0E-08	H *-	BDL
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	< 3.5E-08	H	BDL	< 5.3E-08	H	BDL	< 2.0E-08	H	BDL	< 3.6E-08	H	BDL
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	< 3.3E-08	H	BDL	< 4.2E-08	H	BDL	< 1.8E-08	H	BDL	< 3.1E-08	H	BDL
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	< 2.1E-08	H	BDL	< 3.0E-08	H	BDL	< 1.1E-08	H	BDL	< 2.1E-08	H	BDL
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	< 4.7E-07	H	BDL	< 2.5E-07	H	BDL	< 1.7E-07	H	BDL	< 3.0E-07	H	BDL
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	< 3.7E-08	H	BDL	< 6.3E-08	H	BDL	< 2.1E-08	H	BDL	< 4.0E-08	H	BDL
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	< 6.7E-07	H J x	DLL	< 3.2E-07	H x	BDL	< 2.6E-07	H J x	DLL	< 4.2E-07	H J x	DLL
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	< 2.4E-08	H	BDL	< 3.4E-08	H	BDL	< 1.3E-08	H	BDL	< 2.4E-08	H	BDL
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	< 4.9E-08	H *-	BDL	< 4.7E-08	H *-	BDL	< 2.5E-08	H *-	BDL	< 4.0E-08	H *-	BDL
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	< 9.0E-08	H *+	BDL	< 9.7E-08	H *+	BDL	< 5.5E-08	H *+	BDL	< 8.1E-08	H *+	BDL
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	< 5.8E-08	H *1	BDL	< 6.2E-08	H *1	BDL	< 2.8E-08	H *1	BDL	< 5.0E-08	H *1	BDL
2-(N-ethylperfluoro-1-octanesulfonamido) ethanol	< 4.2E-08	H	BDL	< 4.6E-08	H	BDL	< 2.4E-08	H	BDL	< 3.7E-08	H	BDL
Perfluoro-n-octadecanoic acid (PFODA)	< 4.6E-08	H	BDL	< 6.5E-08	H	BDL	< 2.4E-08	H	BDL	< 4.5E-08	H	BDL
2-(N-methylperfluoro-1-octanesulfonamido) ethanol	< 5.6E-07	J H	DLL	< 2.2E-07	J H	DLL	< 1.9E-07	J H	DLL	< 3.2E-07	J H	DLL
N-methylperfluorooctane sulfonamide (NMeFOSA)	< 4.4E-08	H	BDL	< 5.1E-08	H	BDL	< 2.5E-08	H	BDL	< 4.0E-08	H	BDL
N-ethylperfluorooctane sulfonamide (NEtFOSA)	< 4.9E-08	H	BDL	< 7.1E-08	H	BDL	< 2.8E-08	H	BDL	< 5.0E-08	H	BDL
Perfluoro-n-hexadecanoic acid (PFHxDA)	< 5.6E-08	H	BDL	< 7.4E-08	H	BDL	< 2.9E-08	H	BDL	< 5.3E-08	H	BDL
Perfluorododecanesulfonic acid (PFDoS)	< 5.1E-08	H *-	BDL	< 5.5E-08	H *-	BDL	< 3.1E-08	H *-	BDL	< 4.5E-08	H *-	BDL
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	< 4.2E-08	H	BDL	< 7.1E-08	H	BDL	< 2.4E-08	H	BDL	< 4.6E-08	H	BDL
10:2 Fluorotelomer carboxylic acid	< 1.3E-07	H	BDL	< 1.7E-07	H	BDL	< 7.3E-08	H	BDL	< 1.2E-07	H	BDL
6:2 Fluorotelomer carboxylic acid	< 1.2E-07	H	BDL	< 1.6E-07	H	BDL	< 6.6E-08	H	BDL	< 1.1E-07	H	BDL
7:3 Fluorotelomer carboxylic acid	< 8.0E-08	*+ H	BDL	< 1.1E-07	*+ H	BDL	< 4.2E-08	*+ H	BDL	< 7.6E-08	*+ H	BDL
6:2 Fluorotelemer unsaturated acid	< 3.0E-08	H	BDL	< 4.5E-08	H	BDL	< 1.6E-08	H	BDL	< 3.0E-08	H	BDL
8:2 Fluorotelomer carboxylic acid	< 1.1E-07	H	BDL	< 1.6E-07	H	BDL	< 6.1E-08	H	BDL	< 1.1E-07	H	BDL
8:2 Fluorotelemer unsaturated acid	< 5.3E-08	H	BDL	< 9.4E-08	H	BDL	< 3.0E-08	H	BDL	< 5.9E-08	H	BDL
5:3 Fluorotelomer carboxylic acid	< 1.0E-07	*+ J H	DLL	< 1.5E-07	*+ H	BDL	< 5.4E-08	*+ H	BDL	< 1.0E-07	*+ J H	DLL
3-Perfluoropropylpropanoic acid	< 7.0E-08	H	BDL	< 1.1E-07	H	BDL	< 3.9E-08	H	BDL	< 7.3E-08	H	BDL
Perfluoro-3-methoxypropanoic acid (PFMPA)	< 6.3E-08	H	BDL	**2.1E-07**	J H	ADL	< **7.7E-08**	H J	DLL	< **1.2E-07**	H J	DLL
Perfluoro-4-methoxybutanoic acid (PFMBA)	< 4.8E-08	H	BDL	< 9.6E-08	J H	DLL	< 2.7E-08	H	BDL	< 5.7E-08	H J	DLL
Perfluoro-4-ethylcyclohexanesulfonic acid	< 5.2E-08	*+ H	BDL	< 8.0E-08	*+ H	BDL	< 2.9E-08	*+ H	BDL	< 5.4E-08	*+ H	BDL
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	< 3.4E-08	H	BDL	< 6.0E-08	H	BDL	< 1.9E-08	H	BDL	< 3.8E-08	H	BDL

TABLE 1 Continued

EPA OTM - 45 TEST RESULTS SUMMARY

Gasifier Stack

Note: " < " indicates one or more fractions contributing to the total results are below analytical minimum detection level (MDL)
Bold indicates result or sum of results includes fraction with mass above the analyitical reporting limit (RL)
Detection Limit Flags

ADL = Above detection limit, where each fraction has detected amounts of a target compound (9.5.1 OTM-45)
BDL = Below detection limit, where all fractions were at or below the detection limit for a target compound (9.5.2 OTM-45)
DLL = Detection limit limited, where at least one of the fractions is below detection limit and at least one fraction is above the detection limit (9.5.3 OTM-45)

Project Analytical Flags

A = >10% breakthrough to backup trap, mass included.
Q = potential contamination in breakthrough trap, mass not included (9.1.6 OTM-45)
X = compound was above MDL in FMSB
Y = Proof Blank results is > 10% of total run compound mass

Lab Qualifiers

*- = LCS and/or LCSD is outside acceptance limits, low biased.
*+ = LCS and/or LCSD is outside acceptance limits, high biased.
*1 = LCS/LCSD RPD exceeds control limits.
B = Compound was found in blank and sample.
H= Sample was prepped or analyzed beyond the specified holding time.
I = Value is EMPC (estimated maximum possible concentration).
J = Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

TABLE 2

Process Sample Analysis Results

Biosolids Gasification Process

Sample		**BC-01**	**BC-02**	**BC-03**	**BS-01**	**BS-02**	**BS-03**	**FS-00**	**SS-01**	**SS-02**	**SS-03**		**CW-00**
Sample Type		**Biochar**	**Biochar**	**Biochar**	**Dry Biosolids**	**Dry Biosolids**	**Dry Biosolids**	**Fresh Solvent**	**Spent Solvent**	**Spent Solvent**	**Spent Solvent**		**Quench Water**
Date		**11/19/2024**	**11/20/2024**	**11/20/2024**	**11/19/2024**	**11/20/2024**	**11/20/2024**	**11/20/2024**	**11/19/2024**	**11/20/2024**	**11/20/2024**		**11/19/2024**
Sample Matrix		**Solid**	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**	**Solid**		**Process Water**
Parameter	Units											Units	
Per- and Polyfluoroalkyl Substances													
10:2 Fluorotelemer unsaturated acid (10:2 FTUCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	**0.18 J**	**0.12 J**	< 0.20 UJ	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.37 U
10:2 Fluorotelomer carboxylic acid (10:2 FTCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 UJ	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.46 U
10:2 Fluorotelomer sulfonate (10:2 FTS)	ng/g	< 0.59 U	< 0.59 U	< 0.57 U	< 0.31 U	< 0.32 U	< 0.31 U	< 0.59 U	< 0.59 UJ	< 0.55 UJ	< 0.59 UJ	ng/l	< 0.74 U
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.46 U
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	ng/g	< 0.59 U	< 0.59 U	< 0.57 U	**0.35 J**	**0.32 J**	< 0.31 U	< 0.59 U	< 0.59 UJ	< 0.55 UJ	< 0.59 UJ	ng/l	< 0.55 U
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid (4:2 FTS)	ng/g	< 0.59 U	< 0.59 U	< 0.57 U	< 0.31 U	< 0.32 U	< 0.31 U	< 0.59 U	< 0.59 UJ	< 0.55 UJ	< 0.59 UJ	ng/l	< 0.46 U
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	ng/g	< 0.59 U	< 0.59 U	< 0.57 U	**1.7 J**	**1.2 J**	**1.3 J**	< 0.59 U	< 0.59 UJ	< 0.55 UJ	< 0.59 UJ	ng/l	< 1.0 U
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (N-EtFOSE)	ng/g	< 0.50 U	< 0.49 U	< 0.47 U	**0.63 J**	**0.74 J**	**0.94 J**	< 0.49 U	< 0.49 U	< 0.46 U	< 0.50 U	ng/l	< 0.37 U
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (N-MeFOSE)	ng/g	< 0.50 U	< 0.49 U	< 0.47 U	**2.0**	**3.8**	**3.1**	< 0.49 U	< 0.49 U	< 0.46 U	< 0.50 U	ng/l	< 0.37 U
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**4.9**	**3.9**	**3.5**	R	< 0.20 U	**0.22 J**	< 0.20 U	ng/l	< 1.0 U
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**27**	**26**	**24**	< 0.20 U	**2.5 J**	**11 J**	**2.1 J**	ng/l	< 0.46 U
3-Perfluoropropylpropanoic acid (3:3 FTCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.82**	**0.82**	**0.64**	< 0.20 UJ	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	< 0.46 U
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	< 0.46 U
6:2 Fluorotelemer unsaturated acid (6:2 FTUCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.50**	**0.37**	**0.37**	R	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.37 U
6:2 Fluorotelomer carboxylic acid (6:2 FTCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.50**	**0.26 J**	**0.42**	R	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.64 U
8:2 Fluorotelemer unsaturated acid (8:2 FTUCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.41**	**0.29 J**	**0.25 J**	R	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.37 U
8:2 Fluorotelomer carboxylic acid (8:2 FTCA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.22 J**	< 0.11 U	< 0.10 U	R	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.37 U
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.46 U
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/g	< 0.99 U	< 0.98 U	< 0.94 U	< 1.0 U	< 1.1 U	< 1.0 U	**2.6 J**	< 0.98 U	**1.2 J**	< 0.99 U	ng/l	< 1.5 U
Methylperfluoro-1-octanesulfonamide (N-MEFOSA)	ng/g	< 0.50 U	< 0.49 U	< 0.47 U	< 0.26 U	< 0.27 U	< 0.26 U	< 0.49 U	< 0.49 U	< 0.46 U	< 0.50 U	ng/l	< 0.64 U
n-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**4.5**	**3.8**	**3.5**	< 0.20 UJ	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.46 U
n-Ethylperfluoroctansulfonamide (N-EtFOSA)	ng/g	< 0.50 U	< 0.49 U	< 0.47 U	< 0.26 U	< 0.27 U	< 0.26 U	< 0.49 U	< 0.49 U	< 0.46 U	< 0.50 U	ng/l	< 0.37 U
n-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**4.1**	**3.8 J**	**3.3 J**	< 0.20 UJ	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.37 U
Nonafluoro-3, 6-dioxaheptanoic acid (NFDHA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluoro-3-methoxypropanoic acid (PFMPA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 UJ	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	< 0.28 U
Perfluoro-4-ethylcyclohexanesulfonic acid (PFecHS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.11 J**	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluoro-4-methoxybutanoic acid (PFMBA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 UJ	< 0.20 U	ng/l	< 0.28 U
Perfluorobutanesulfonic acid (PFBS)	ng/g	< 0.40 U	< 0.39 U	< 0.38 U	**3.1 J**	**2.4 J**	**1.8 J**	< 0.40 U	< 0.39 U	< 0.37 U	< 0.40 U	ng/l	**1.8**
Perfluorobutanoic acid (PFBA)	ng/g	< 0.79 U	< 0.78 U	< 0.75 U	< 0.42 U	**0.53 J**	< 0.42 U	< 0.79 UJ	< 0.78 UJ	< 0.73 UJ	< 0.79 UJ	ng/l	**2.7**
Perfluorodecanesulfonic acid (PFDS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluorodecanoic acid (PFDA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**3.5**	**2.8**	< 0.10 U	< 0.20 UJ	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	< 0.28 U
Perfluorododecanesulfonic acid (PFDOS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluorododecanoic acid (PFDoA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 UJ	< 0.20 U	ng/l	< 0.37 U
Perfluoroheptanesulfonic acid (PFHpS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluoroheptanoic acid (PFHpA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.90**	**0.62**	**0.56**	< 0.20 U	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	**1.4 J**
Perfluorohexadecanoic Acid (PFHxDA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 UJ	< 0.18 UJ	< 0.20 U	ng/l	< 0.46 U
Perfluorohexanesulfonic acid (PFHxS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.61**	**0.46**	**0.38**	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	**0.94 J**
Perfluorohexanoic acid (PFHxA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**5.8**	**5.5**	**4.9**	< 0.20 UJ	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	**2.9**
Perfluorononanesulfonic acid (PFNS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluorononanoic acid (PFNA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**1.4**	**1.0**	**0.93**	< 0.20 UJ	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	**0.58 J**
Perfluorooctadecanoic Acid (PFOCDA / PFODA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 UJ	< 0.18 UJ	< 0.20 U	ng/l	< 0.46 U
Perfluorooctanesulfonamide (PFOSA / FOSA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.25 J**	**0.26 J**	**0.26 J**	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	**5.5**
Perfluorooctanesulfonic acid (PFOS)	ng/g	< 0.20 U	< 0.20 U	**0.21 J**	**3.6 J**	**9.0**	**3.3 J**	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	**2.2**
Perfluorooctanoic acid (PFOA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**3.2**	**2.3**	**2.0**	< 0.20 UJ	< 0.20 UJ	< 0.18 UJ	**0.34 J**	ng/l	**4.5**
Perfluoropentanesulfonic acid (PFPeS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 U	< 0.20 U	ng/l	< 0.28 U
Perfluoropentanoic acid (PFPeA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	**0.29 J**	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	**3.1**
Perfluoropropanesulfonic acid (PFPrS)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	**4.3**	< 0.10 U	< 0.20 UJ	< 0.20 UJ	< 0.18 UJ	< 0.20 UJ	ng/l	< 0.37 U
Perfluorotetradecanoic acid (PFTA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**0.41**	**0.35**	**0.34**	< 0.20 U	< 0.20 UJ	< 0.18 UJ	< 0.20 U	ng/l	< 0.37 U
Perfluorotridecanoic acid (PFTrDA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	< 0.10 U	< 0.11 U	< 0.10 U	< 0.20 U	< 0.20 U	< 0.18 UJ	< 0.20 U	ng/l	< 0.37 U
Perfluoroundecanoic acid (PFUnA)	ng/g	< 0.20 U	< 0.20 U	< 0.19 U	**1.2**	**1.1**	**0.98**	< 0.20 U	< 0.20 U	< 0.18 UJ	< 0.20 U	ng/l	< 0.28 U

Note: " < " indicates one or more fractions contributing to the total results are below analytical minimum detection level (MDL)
Bold indicates result or sum of results includes fraction with mass above the analyitical reporting limit (RL)

Lab Qualifiers
- -- = Not analyzed/Not available.
- N = Sample Type: Normal
- J = Estimated detected value. Either certain QC criteria were not met or the concentration is between the laboratory's detection and quantitation limits.
- R = The data are unusable. The samples results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- U = The analyte was analyzed for, but was not detected.
- H= Sample was prepped or analyzed beyond the specified holding time.

TABLE 3

Process Sample Analysis Results

Biosolids Gasifier Process

Sample		BS-2	SL-2		W-(1-4)
Sample Type		Dry Biosolids	Sludge		Process Water
Date		11/19/2024	11/19/2024		11/19/2024
Sample Matrix		Solid	Solid		Water
Parameter	Units			Units	
General Parameters					
Moisture	%	**5.0**	**82.4**	--	--
Per- and Polyfluoroalkyl Substances					
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid (11Cl-PF3OUdS)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 1.7 UH
1H,1H, 2H, 2H-Perfluorodecane sulfonic acid (8:2 FTS)	ng/g	< 1.4 UH	< 4.3 UH	ng/l	< 33 UH
1H,1H, 2H, 2H-Perfluorohexane sulfonic acid (4:2 FTS)	ng/g	< 1.4 UHJ	< 4.3 UH	ng/l	< 3.3 UH
1H,1H, 2H, 2H-Perfluorooctane sulfonic acid (6:2 FTS)	ng/g	**2.0 H**	< 4.3 UH	ng/l	**7.8 HJ**
2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol (N-EtFOSE)	ng/g	< 3.5 UH	**4.7 HJ**	ng/l	< 8.3 UH
2-(N-methylperfluoro-1-octanesulfonamido)-ethanol (N-MeFOSE)	ng/g	< 3.5 UHJ	**10 HJ**	ng/l	< 8.3 UH
3-Perfluoroheptylpropanoic acid (7:3 FTCA)	ng/g	**120 HJ**	**41 H**	ng/l	**35 H**
3-Perfluoropentylpropanoic acid (5:3 FTCA)	ng/g	**180 HJ**	**280 H**	ng/l	**680 H**
3-Perfluoropropylpropanoic acid (3:3 FTCA)	ng/g	< 1.4 UHJ	< 4.3 UH	ng/l	**7.9 H**
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 1.7 UH
9-Chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9Cl-PF3ONS)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 1.7 UH
Hexafluoropropylene oxide dimer acid (HFPO-DA)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 3.3 UH
Methylperfluoro-1-octanesulfonamide (N-MEFOSA)	ng/g	< 0.69 UH	< 2.1 UH	ng/l	< 1.7 UH
n-Ethyl perfluorooctanesulfonamidoacetic acid (NEtFOSAA)	ng/g	**3.5 H**	**4.8 H**	ng/l	< 1.7 UH
n-Ethylperfluoroctansulfonamide (N-EtFOSA)	ng/g	< 0.69 UH	< 2.1 UH	ng/l	< 1.7 UH
n-Methyl perfluorooctanesulfonamidoacetic acid (NMeFOSAA)	ng/g	**4.5 H**	**5.2 H**	ng/l	**0.95 HJ**
Nonafluoro-3, 6-dioxaheptanoic acid (NFDHA)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 1.7 UH
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 1.7 UH
Perfluoro-3-methoxypropanoic acid (PFMPA)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	**52 H**
Perfluoro-4-methoxybutanoic acid (PFMBA)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 1.7 UH
Perfluorobutanesulfonic acid (PFBS)	ng/g	**3.9 HJ**	< 13 UH	ng/l	**25 H**
Perfluorobutanoic acid (PFBA)	ng/g	< 1.4 UHJ	< 4.3 UH	ng/l	< 3.3 UH
Perfluorodecanesulfonic acid (PFDS)	ng/g	**0.87 H**	**0.97 HJ**	ng/l	< 1.7 UH
Perfluorodecanoic acid (PFDA)	ng/g	**5.0 HJ**	**3.9 HJ**	ng/l	**4.9 H**
Perfluorododecanesulfonic acid (PFDOS)	ng/g	< 0.69 UH	< 2.1 UH	ng/l	< 1.7 UH
Perfluorododecanoic acid (PFDoA)	ng/g	**2.0 H**	**2.3 HJ**	ng/l	< 1.7 UH
Perfluoroheptanesulfonic acid (PFHpS)	ng/g	< 0.69 UH	< 2.1 UH	ng/l	< 1.7 UH
Perfluoroheptanoic acid (PFHpA)	ng/g	**1.1 HJ**	< 2.7 UH	ng/l	**25 HJ**
Perfluorohexanesulfonic acid (PFHxS)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	**3.3 H**
Perfluorohexanoic acid (PFHxA)	ng/g	**9.2 HJ**	**3.4 H**	ng/l	**130 H**
Perfluorononanesulfonic acid (PFNS)	ng/g	< 0.69 UH	< 2.1 UH	ng/l	< 1.7 UH
Perfluorononanoic acid (PFNA)	ng/g	**1.9 H**	**2.2 HJ**	ng/l	**7.4 H**
Perfluorooctanesulfonamide (PFOSA / FOSA)	ng/g	< 0.69 UHJ	< 2.1 UHJ	ng/l	< 1.7 UH
Perfluorooctanesulfonic acid (PFOS)	ng/g	**13 H**	**9.0 H**	ng/l	**7.5 H**
Perfluorooctanoic acid (PFOA)	ng/g	**5.1 HJ**	**3.7 H**	ng/l	**41 H**
Perfluoropentanesulfonic acid (PFPeS)	ng/g	< 0.69 UHJ	< 2.1 UH	ng/l	< 1.7 UH
Perfluoropentanoic acid (PFPeA)	ng/g	**2.2 HJ**	< 2.1 UH	ng/l	**67 H**
Perfluorotetradecanoic acid (PFTA)	ng/g	< 0.69 UH	< 2.1 UH	ng/l	< 1.7 UH
Perfluorotridecanoic acid (PFTrDA)	ng/g	< 0.69 UH	< 2.1 UH	ng/l	< 1.7 UH
Perfluoroundecanoic acid (PFUnA)	ng/g	< 2.6 UH	< 2.7 UH	ng/l	< 0.63 UH

Note: " < " indicates one or more fractions contributing to the total results are below analytical minimum detection level (MDL)
Bold indicates result or sum of results includes fraction with mass above the analyitical reporting limit (RL)

Lab Qualifiers

-- = Not analyzed/Not available.

N = Sample Type: Normal

J = Estimated detected value. Either certain QC criteria were not met or the concentration is between the laboratory's detection and quantitation limits.

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U = The analyte was analyzed for, but was not detected.

H= Sample was prepped or analyzed beyond the specified holding time.

TABLE 4

PFAS Mass Balance
Destruction Removal Efficiency with Condensate

Biosolids Gasifier Process

PFAS Compounds	Run 1	Run 2	Run 3	Average DRE, %
Perfluorobutanoic acid (PFBA)	*	*	*	*
Perfluoropentanoic acid (PFPeA)	*	*	*	*
Perfluorohexanoic acid (PFHxA)	*	*	24.3%	24.3%
Perfluoroheptanoic acid (PFHpA)	*	*	*	*
Perfluorooctanoic acid (PFOA)	60.4%	63.7%	81.8%	68.6%
Perfluorononanoic acid (PFNA)	81.0%	86.1%	93.3%	86.8%
Perfluorodecanoic acid (PFDA)	90.0%	90.8%	96.6%	92.5%
Perfluoroundecanoic acid (PFUnA)	*	*	*	*
Perfluorododecanoic acid (PFDoA)	98.3%	97.9%	99.4%	98.5%
Perfluorotridecanoic acid (PFTriA)	*	*	-	*
Perfluorotetradecanoic acid (PFTeA)	*	*	*	*
Perfluorobutanesulfonic acid (PFBS)	*	*	*	*
Perfluorohexanesulfonic acid (PFHxS)	*	*	*	*
Perfluoroheptanesulfonic acid (PFHpS)	-	-	-	-
Perfluorooctanesulfonic acid (PFOS)	99.3%	99.4%	99.4%	99.4%
Perfluorodecanesulfonic acid (PFDS)	100.0%	100.0%	100.0%	100.0%
Perfluorooctanesulfonamide (FOSA)	100.0%	100.0%	100.0%	100.0%
Perfluoropentanesulfonic acid (PFPeS)	-	-	-	-
Perfluorononanesulfonic acid (PFNS)	-	-	-	-
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	99.9%	99.9%	99.9%	99.9%
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100.0%	100.0%	100.0%	100.0%
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	*	*	*	*
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	-	-	-	-
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	61.6%	53.8%	85.0%	66.8%
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	-	-	-	-
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	-	-	-	-
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	-	-	-	-
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	-	-	-	-
2-(N-ethylperfluoro-1-octanesulfonamido) ethanol	100.0%	100.0%	100.0%	100.0%
Perfluoro-n-octadecanoic acid (PFODA)	-	-	-	-
2-(N-methylperfluoro-1-octanesulfonamido) ethanol	98.7%	99.5%	99.6%	99.3%
N-methylperfluorooctane sulfonamide (NMeFOSA)	-	-	-	-
N-ethylperfluorooctane sulfonamide (NEtFOSA)	-	-	-	-
Perfluoro-n-hexadecanoic acid (PFHxDA)	-	-	-	-
Perfluorododecanesulfonic acid (PFDoS)	-	-	-	-
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	-	-	-	-
10:2 Fluorotelomer carboxylic acid	-	-	-	-
6:2 Fluorotelomer carboxylic acid	-	-	-	-
7:3 Fluorotelomer carboxylic acid	99.5%	99.5%	99.5%	99.5%
6:2 Fluorotelemer unsaturated acid	-	-	-	-
8:2 Fluorotelomer carboxylic acid	-	-	-	-
8:2 Fluorotelemer unsaturated acid	-	-	-	-
5:3 Fluorotelomer carboxylic acid	98.5%	98.1%	98.5%	98.4%
3-Perfluoropropylpropanoic acid	*	*	*	*
Perfluoro-3-methoxypropanoic acid (PFMPA)	*	*	*	*
Perfluoro-4-methoxybutanoic acid (PFMBA)	-	*	-	*
Perfluoro-4-ethylcyclohexanesulfonic acid	-	-	-	-
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	-	-	-	-
Total PFAS Removal Efficiency (with Condensate)	**95.0%**	**95.4%**	**97.3%**	**95.9%**

* Indicates that more PFAS is in the sum of outputs than the sum of inputs for that compound indicating a possible product of incomplete combustion or destruction (PIC or PID) or an existing unknown compound formation mechanism

- Indicates the analyte was analyzed for but not detected in the solid or air samples

TABLE 5

PFAS Mass Balance
Destruction Removal Efficiency without Condensate

Biosolids Gasifier Process

PFAS Compounds	Run 1	Run 2	Run 3	Average DRE, %
Perfluorobutanoic acid (PFBA)	*	*	*	*
Perfluoropentanoic acid (PFPeA)	*	*	*	*
Perfluorohexanoic acid (PFHxA)	*	*	45.6%	45.6%
Perfluoroheptanoic acid (PFHpA)	*	*	*	*
Perfluorooctanoic acid (PFOA)	66.5%	69.6%	88.0%	74.7%
Perfluorononanoic acid (PFNA)	82.8%	87.9%	95.2%	88.6%
Perfluorodecanoic acid (PFDA)	90.7%	91.5%	97.3%	93.2%
Perfluoroundecanoic acid (PFUnA)	*	*	*	*
Perfluorododecanoic acid (PFDoA)	98.3%	97.9%	99.4%	98.5%
Perfluorotridecanoic acid (PFTriA)	*	*	-	*
Perfluorotetradecanoic acid (PFTeA)	*	*	*	*
Perfluorobutanesulfonic acid (PFBS)	*	100.0%	100.0%	100.0%
Perfluorohexanesulfonic acid (PFHxS)	100.0%	100.0%	100.0%	100.0%
Perfluoroheptanesulfonic acid (PFHpS)	-	-	-	-
Perfluorooctanesulfonic acid (PFOS)	99.8%	99.8%	99.9%	99.9%
Perfluorodecanesulfonic acid (PFDS)	100.0%	100.0%	100.0%	100.0%
Perfluorooctanesulfonamide (FOSA)	100.0%	100.0%	100.0%	100.0%
Perfluoropentanesulfonic acid (PFPeS)	-	-	-	-
Perfluorononanesulfonic acid (PFNS)	-	-	-	-
N-methylperfluorooctanesulfonamidoacetic acid (NMeFOSAA)	100.0%	100.0%	100.0%	100.0%
N-ethylperfluorooctanesulfonamidoacetic acid (NEtFOSAA)	100.0%	100.0%	100.0%	100.0%
1H,1H,2H,2H-Perfluorohexane sulfonic acid (4:2 FTS)	-	-	-	-
1H,1H,2H,2H-Perfluorooctane sulfonic acid (6:2 FTS)	-	-	-	-
1H,1H,2H,2H-Perfluorodecane sulfonic acid (8:2 FTS)	-	-	-	-
Hexafluoropropylene Oxide Dimer Acid (HFPO-DA)	61.6%	53.8%	85.0%	66.8%
9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	-	-	-	-
11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	-	-	-	-
4,8-Dioxa-3H-perfluorononanoic acid (ADONA)	-	-	-	-
1H,1H,2H,2H-Perfluorododecane sulfonic acid (10:2 FTS)	-	-	-	-
2-(N-ethylperfluoro-1-octanesulfonamido) ethanol	100.0%	100.0%	100.0%	100.0%
Perfluoro-n-octadecanoic acid (PFODA)	-	-	-	-
2-(N-methylperfluoro-1-octanesulfonamido) ethanol	98.7%	99.5%	99.6%	99.3%
N-methylperfluorooctane sulfonamide (NMeFOSA)	-	-	-	-
N-ethylperfluorooctane sulfonamide (NEtFOSA)	-	-	-	-
Perfluoro-n-hexadecanoic acid (PFHxDA)	-	-	-	-
Perfluorododecanesulfonic acid (PFDoS)	-	-	-	-
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	-	-	-	-
10:2 Fluorotelomer carboxylic acid	-	-	-	-
6:2 Fluorotelomer carboxylic acid	-	-	-	-
7:3 Fluorotelomer carboxylic acid	100.0%	99.9%	100.0%	100.0%
6:2 Fluorotelemer unsaturated acid	-	-	-	-
8:2 Fluorotelomer carboxylic acid	-	-	-	-
8:2 Fluorotelemer unsaturated acid	-	-	-	-
5:3 Fluorotelomer carboxylic acid	99.8%	99.4%	99.9%	99.7%
3-Perfluoropropylpropanoic acid	-	-	-	*
Perfluoro-3-methoxypropanoic acid (PFMPA)	-	*	*	*
Perfluoro-4-methoxybutanoic acid (PFMBA)	-	*	-	*
Perfluoro-4-ethylcyclohexanesulfonic acid	-	-	-	-
Perfluoro (2-ethoxyethane) sulfonic acid (PFEESA)	-	-	-	-
Total PFAS Removal Efficiency (no Condensate)	**96.6%**	**97.0%**	**98.9%**	**97.5%**

* Indicates that more PFAS is in the sum of outputs than the sum of inputs for that compound indicating a possible product of incomplete combustion or destruction (PIC or PID) or an existing unknown compound formation mechanism

- Indicates the analyte was analyzed for but not detected in the solid or air samples

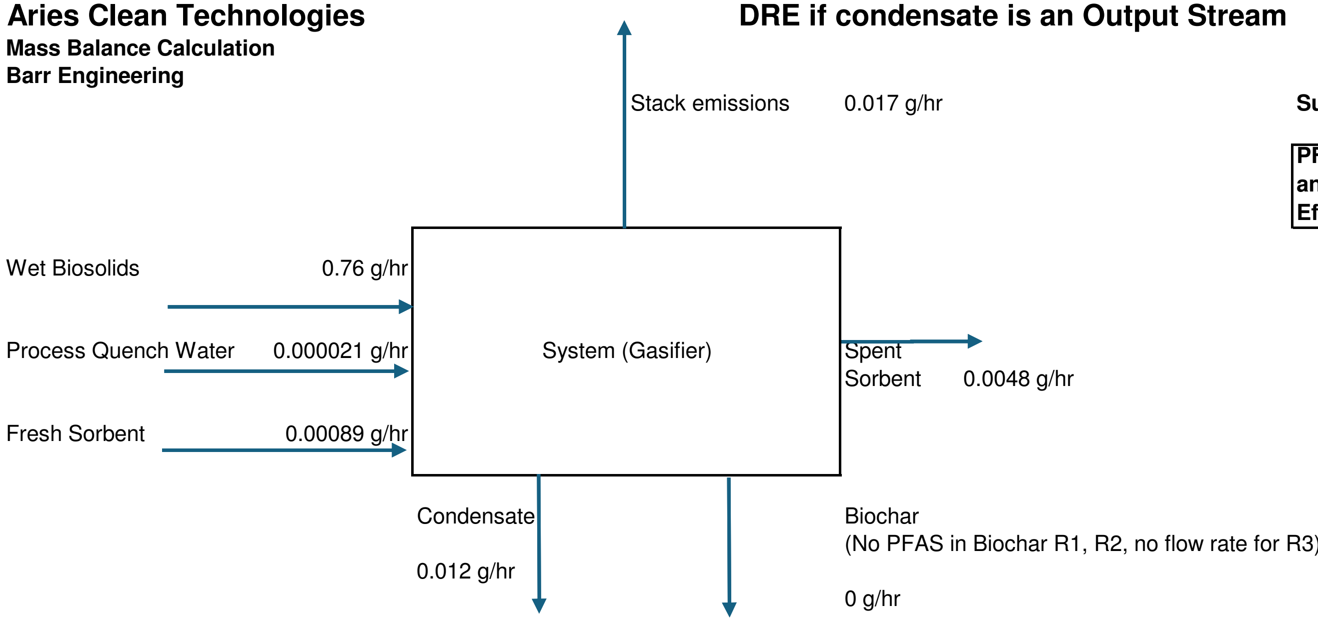
Figures

FIGURE 1

Aries Clean Technologies

Mass Balance Calculation
Barr Engineering

DRE if condensate is an Output Stream



Summary

	Run 1	Run 2	Run 3
PFAS Destruction and Removal Efficiency (DRE)	95.0%	95.4%	97.3%

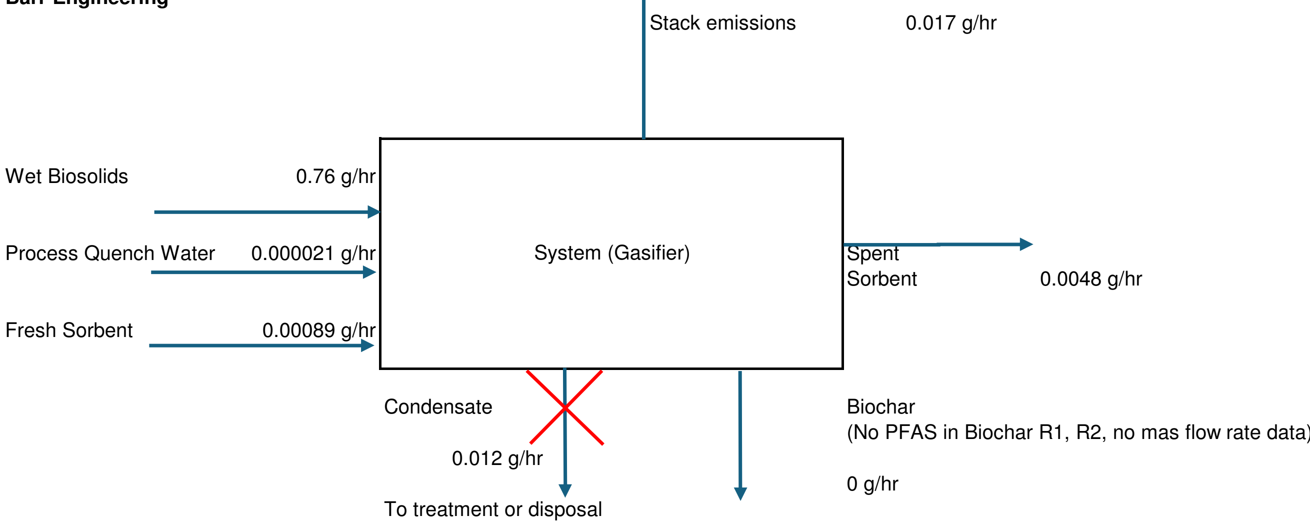
Total detected mass of analyzed PFAS compounds incorporated into this mass balance for each input and output stream

FIGURE 2

Aries Clean Technologies

Mass Balance Calculation
Barr Engineering

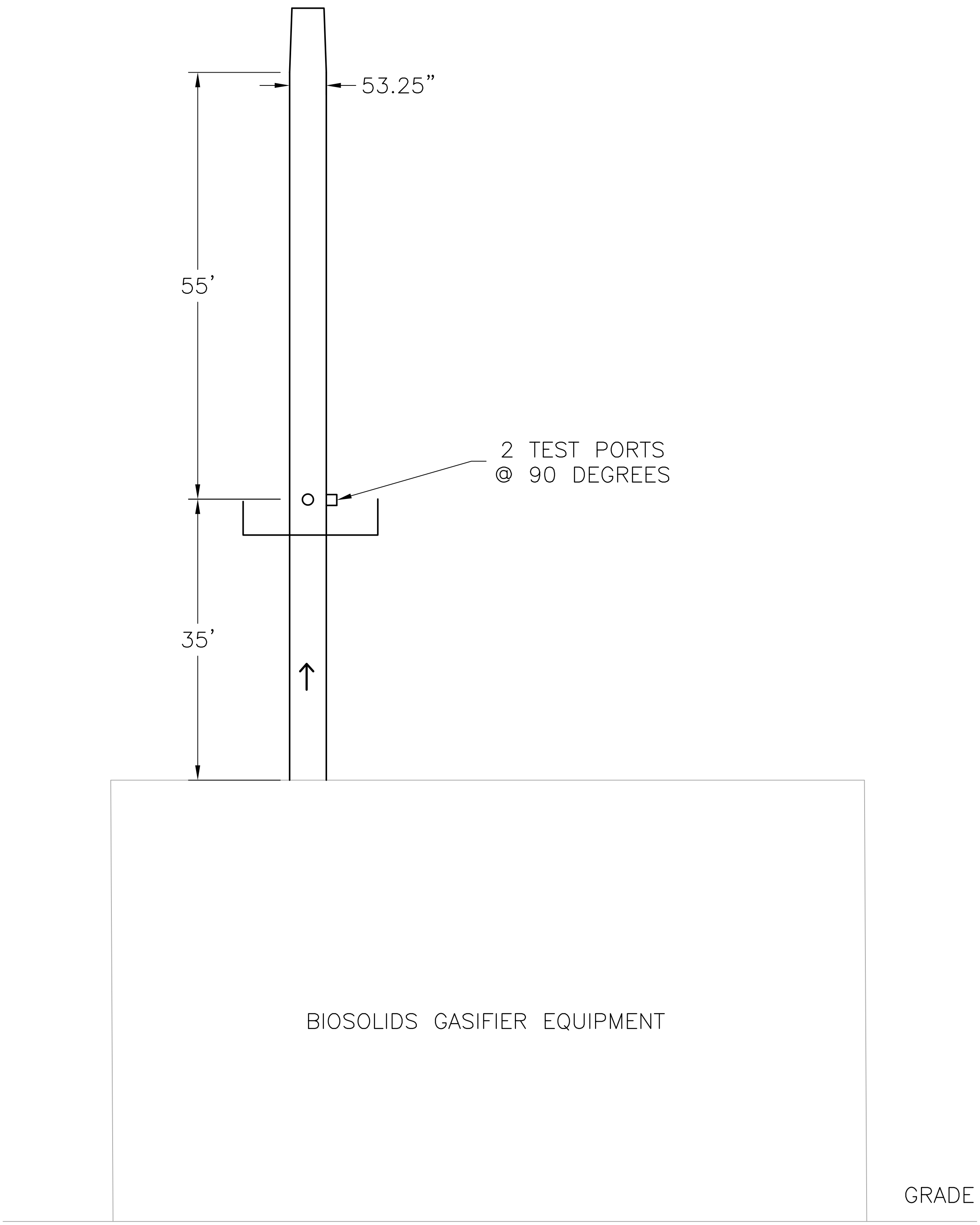
DRE if condensate is treated or disposed



Summary

	Run 1	Run 2	Run 3
PFAS Destruction and Removal Efficiency (DRE)	96.6%	97.0%	98.9%

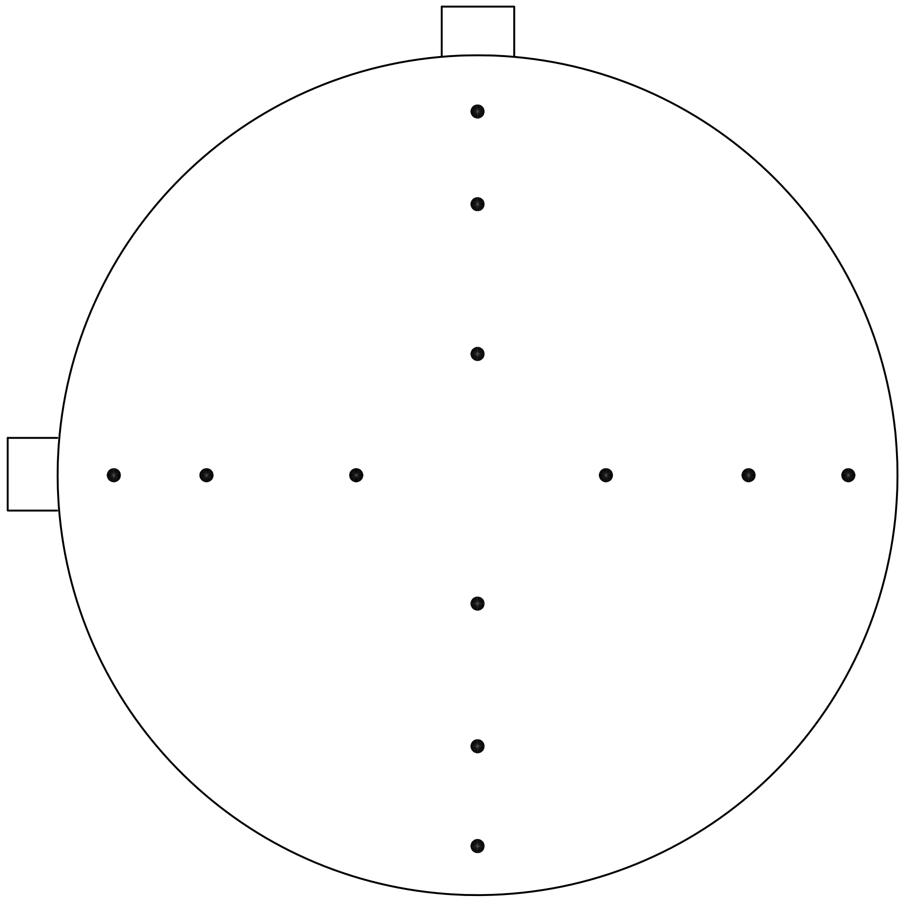
Total detected mass of analyzed PFAS compounds incorporated into this mass balance for each input and output stream



TEST PORT LOCATION
ARIES CLEAN TECHNOLOGIES
LINDEN, NEW JERSEY
GASIFIER STACK

FIGURE 3

NOT TO SCALE



NO. OF TEST PORTS	2
PORT LENGTH	10.00"
PORT DIAMETER	6"
NO. OF TRAVERSE POINTS	12
DUCT DIAMETER	53.25"

POINT	INSERTION DEPTH IN "
1	2.32
2	7.80
3	15.76
4	37.49
5	45.45
6	50.93

TRAVERSE POINT LOCATION
ARIES CLEAN TECHNOLOGIES
LINDEN, NEW JERSEY
GASIFIER STACK

FIGURE 4

NOT TO SCALE

Attachment T

Aries Pine Tree, LLC - Certificate of Good Standing

Interactive Corporate Services

MAINE
Department of the Secretary of State
Bureau of Corporations, Elections and Commissions

Corporate Name Search

Information Summary

Subscriber activity report

This record contains information from the CEC database and is accurate as of: Wed Nov 19 2025 15:00:30. Please print or save for your records.

Legal Name	Charter Number	Filing Type	Status
ARIES PINE TREE LLC	202500723FC	LIMITED LIABILITY COMPANY DOING BUSINESS IN MAINE	GOOD STANDING

Qualification Date	Expiration Date	Jurisdiction
12/06/2024	N/A	DELAWARE

Other Names **(A=Assumed ; F=Former)**

NONE

Principal Home Office Address

Physical	Mailing
4037 RURAL PLAINS CIRCLE STE 290 FRANKLIN, TN 37064	4037 RURAL PLAINS CIRCLE STE 290 FRANKLIN, TN 37064

Clerk/Registered Agent

Physical	Mailing
CORPORATION SERVICE COMPANY 45 MEMORIAL CIRCLE AUGUSTA, ME 04330	CORPORATION SERVICE COMPANY 45 MEMORIAL CIRCLE AUGUSTA, ME 04330

New Search

Click on a link to obtain additional information.

List of Filings View list of filings

Obtain additional information:

Certificate of Existence (Good Standing) (more info)	Short Form without amendments ($30.00)
Certificate of Legal Existence (more info)	Short Form without amendments ($30.00)

You will need Adobe Acrobat version 3.0 or higher in order to view PDF files. If you encounter problems, visit the troubleshooting page.

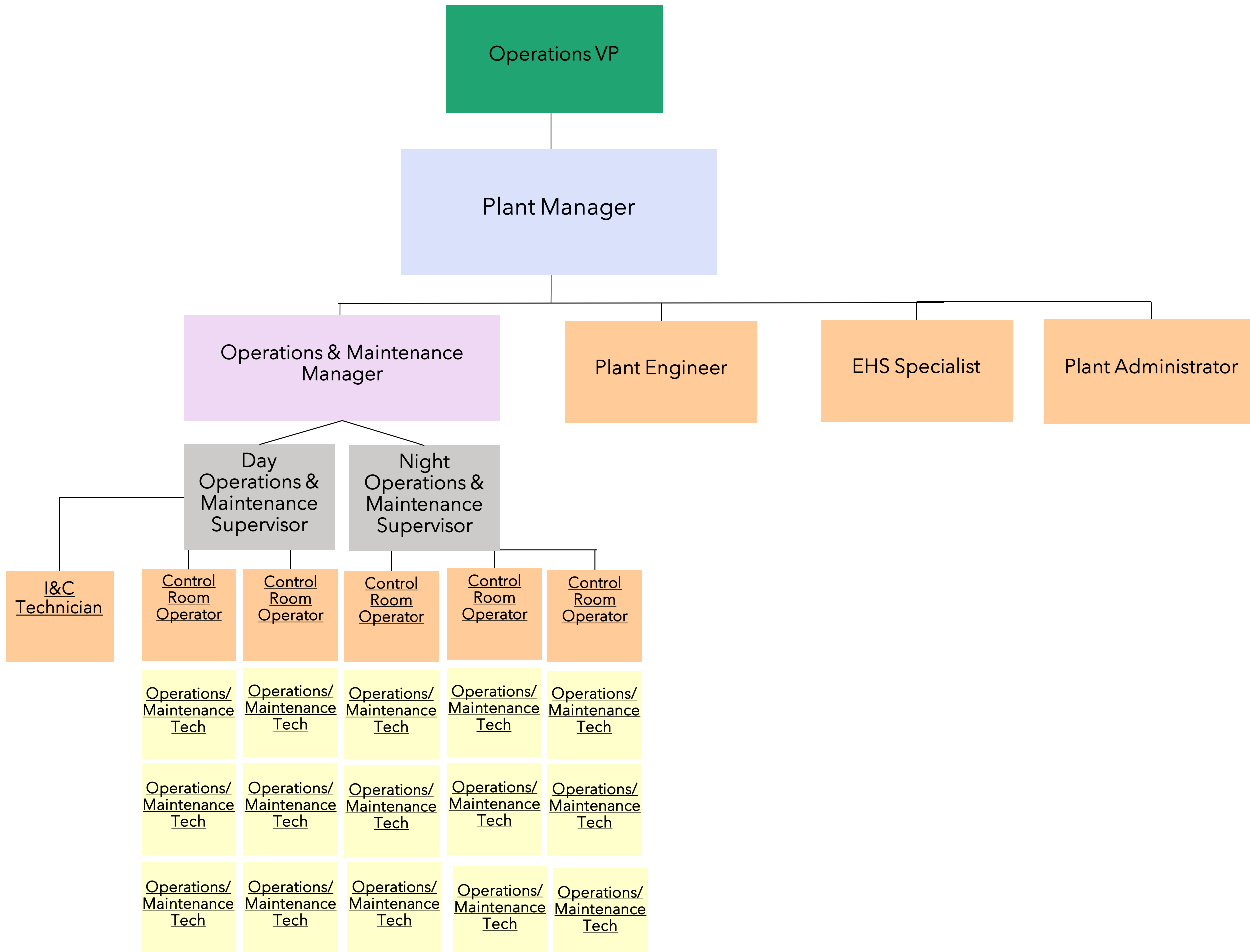
Download

If you encounter technical difficulties while using these services, please contact the Webmaster. If you are unable to find the information you need through the resources provided on this web site, please contact the Division of Corporations, UCC & Commissions Reporting and Information Section at 207-624-7752 or e-mail.

Attachment U

Aries Pine Tree, LLC – Organizational Chart

Organization Chart



ARIES CLEAN TECHNOLOGIES™

Attachment V

Hargrove Experience Profile

Hargrove Qualifications to Aries Clean Energy

Overview & Experience

Hargrove Overview

Hargrove Engineers & Constructors is a full-service EPC and controls and automation project execution firm serving the industrial process industries. We serve our clients with project management, multi-discipline engineering, procurement, construction management, system integration, startup support, and industrial hygiene, as well as providing site-based teams. Hargrove is committed to the Battery industry and has been ranked No. 1 by Engineering News Record Sourcebook in the Chemicals Industry.

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The right people in the right place at the right time.

Hargrove Mission Statement:
Team with our customers to drive mutual and sustained success.

Hargrove is a privately-held firm with 2023 revenue in excess of $580MM.

19 Full-service Offices

Safety Culture:
Our safety culture protects and promotes the well-being of each person that works with us and each person touched by our work.

2737 Full-time Direct Teammates

Hargrove Teammates Companywide

Project Management	285
Process	235
Mechanical + Piping	592
Civil, Structural, + Architectural	277
Electrical + Instrumentation	460
Controls + Automation	125
Project Planning + Controls	169
Procurement	55
Construction Management / Startup	172
Document Control / Project Admin	228
Health + Safety (HSE) and QA/QC	41
Management + Administration	98
TOTAL	2737

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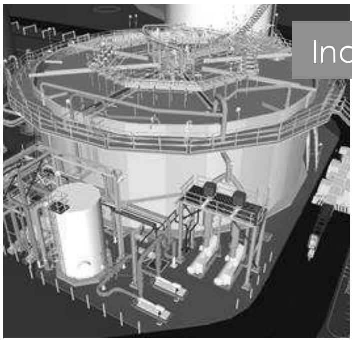
Related Projects – Gasification, Waste Reduction,

ATS Incinerator Upgrade at Krotz Springs Refinery, LA RFQ

Wastewater, Sludge, and Water Treatment



Industrial Wastewater Treatment

For this $40MM TIC project, Hargrove led the FEL, engineering, and procurement effort. As the chemical oxygen demand (COD) freight charged to the existing wastewater treatment plant approached its limit, the refinery reached out to Hargrove to install a third reactor using cost efficient, state-of-the-art technology. This allowed the Louisiana facility to maintain sufficient spare capacity to perform maintenance activities and handle heavy rain events. In addition to the ADVENT Integral System (AIS) reactor, key equipment installations include a new 840,000 gallon sludge tank, cooled water surge tank, antifoam tank and pumps, soda ash injector system, phosphoric acid tank and pumps, effluent to river pumps, antifoam tank and pumps, and aeration blowers. A new electrical substation, which included 4.16 kV switchgear, 4.16 kV motor control centers, 480V switchgear, 480V motor control centers, and substation power transformers, was installed to support project electrical loads.

Wastewater Treatment Reliability and Compliance

Hargrove was retained to provide Detail Design Engineering (DDE) services for this major Wastewater Treatment Upgrade project at a large chemical facility in South Texas. The Wastewater Treatment Plant (WTP) Reliability & Compliance project scope included increasing the hydraulic flow capacity from 3,800 to 5,000 gpm thereby reducing business interruption and potential impact to other Business Unit's production due to overloading of the WTP. This Increased influent capacity allows for current and future demands to be achieved and provide for an additional 1,000 gpm peak demand during heavy rainfall events and production unit upsets.

Sludge Handling, Aeration, and Treatment Upgrades

Project consisted of expansion and upgrades to the primary clarifier sludge handling system and the waste activated sludge system. In addition, the aeration system was expanded along with installation of new diffuser systems. This work included debottlenecking and expansion upgrades to the primary sludge, aeration and sludge dewatering, and solids handling facilities. Numerous projects were scoped and executed to bring the facility up to the required capacity. In addition to the wastewater projects, five water conservations projects were also scoped and executed.

Wastewater Treatment Sludge Screw Press Installation

Project consisted of supply and installation of a Screw Press for dewatering of wastewater treatment plant clarifier sludge. Additional project included the rebuild of a screw press and the associated conveying equipment to increase the consistency of the waste treatment plant sludge to increase its fuel value.

Wastewater Sludge as Fuel Source

Solids from Paper Mill Wastewater Treatment plant dewatered to 50% solids and combined with Biomass as a fuel to steam plant. Hargrove engineered Sludge Dewatering and Solids Handling Upgrades including addition of consistency control on primary and secondary sludge systems, screw press and belt press upgrades and the addition of new solids conveying equipment.

Wastewater Treatment and DAF Install

The project objective for the Wastewater Treatment Upgrade was to install a new aeration basin, secondary clarifier, sludge blend tank, and sludge holding tank. Hargrove engineered associated pumps, piping, foundations, and associated electrical and instrumentation. The mill chose to reuse existing primary clarifier effluent holding tank, so Hargrove updated pumps and instrumentation. Due to the property line restraints, Hargrove had to engineer the wastewater facility with limited space to accommodate both the aeration basin and secondary clarifier. The project was completed in time to meet the State of Oklahoma's requirements for compliance with wastewater discharge.

New Wastewater Treatment Plant

Hargrove provided engineering and design for a new plant consisting of neutralization, equalization, biological treatment, membrane solids separation and sludge dewatering. This project included a Bio Reactor & Membrane Filtration System required for separation and return of bio-solids to the bio reactor. The membrane system was Ultra-filtration with tubular membranes and was equipped with four (4) membrane loops providing 280,000 gallons per day of clear water.

CFA3 Waste Neutralization Expansion

This project consisted of installation of a recovery Tank Farm, expansion of emergency storage facilities, and upgrading of the pH Control System

Process Water Recycling

Detail design project to recycle secondary effluent water of a towel and tissue mill. Scope elements included process design, recovery and treatment equipment, integration through existing mill filtration assets, and separation and distribution into the mill.

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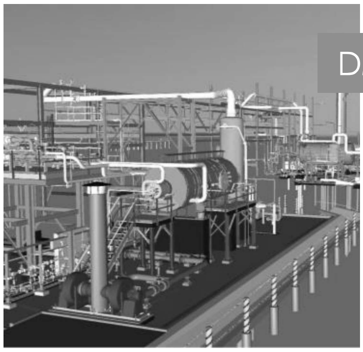
Waste Incineration

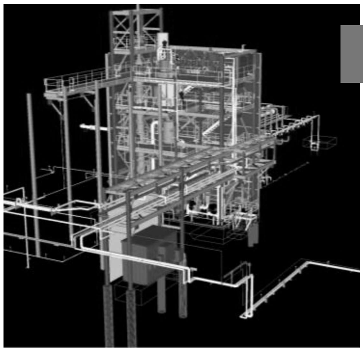
Greenfield Hazardous Waste Incinerator Plant

Role: FEL, EPC (in progress)
Size: $200 MM TIC (Total Installed Cost)
For this EPC project, our team performed the FEL3, detail engineering, procurement, construction and commissioning and startup for a 100,000 tons/yr @4,500BTU/lb. hazardous waste incinerator plant in Arkansas. The plant included feed requirements of liquid, solids and gases via drum, tank storage, rail car and truck. Equipment included a large rotary kiln, storage tanks, pumps and other ancillary equipment. Value is a major driver for this chemical industry project, so Hargrove is utilizing our high value engineering center in Monterrey, Mexico.



DMTA Improvement - Incinerator Upgrade

Roles: FEL, Detailed Design
Size: $39MM TIC
Our scope is to install a new incinerator and scrubber system at a Texas Chemical Plant ahead of a major turnaround in 2020 in order to meet EPA permitting requirements. Our Team developed and maintained process deliverables from FEL-3 though detailed design, including P&IDs, PFDs, Equipment specifications, PSV calculations, and hydraulic calculations. We worked with vendors on incinerator documentation, and specified over 120 instruments. Project was troublesome on specifying equipment with a very corrosive process operating at low pressure to slight vacuum. Equipment and instruments were demolished, replaced, relocated and or some reused, including new junction boxes, new marshalling cabinets and new FTA cabinets. Hargrove worked with the client to achieve their High Value Engineering goals.



New Process Gas Incinerator

Role, FEL, EPCM, Controls + Automation, Panel Fabrication
Size: $11MM TIC
Hargrove led the FEL 1 through design, construction management, controls + automation, panel fabrication, and startup for a new incinerator at a Southeast chemical plant. The total installed cost was $11MM and was part of a Utilities Program Upgrade, in which we managed a series of detailed design and engineering projects that are the utilities expansion piece of the client's major site expansion program. The individual projects associated with this program include a steam boiler expansion, a new process gas incinerator, a new electrical MCC building, upgrades to the site's industrial water and effluent water handling systems, and others.

Grassroots Renewable Gas Plant

Hargrove is leading the FEL3 (FEED) effort to build one (1) of the three (3) plants and the site improvements and facilities required to operate Plant 1. This is an estimated $450MM TIC Grassroots project that will utilize pre-chipped wood, which is gasified to Syngas, converted to methanol and synthesized to gasoline. It consists of 4 trains, only train 1 will be designed for start-up in Q1 2024. Our scope includes the woodyard, SunGas Renewables technology, Syngas Purification, proprietary technology TIGAS, utilities, wastewater treatment and CO2 purification and compression sections. Over the 7-month effort, our team is identifying critical equipment, establishing plant layout and including a high-quality basis for the detail design/procurement phase of the project. We are revising the overall site layout to include wood drying equipment, the Gasifier wastewater heat exchanger, which will deliver hot air to the furnace, and the GTG / HRSG power island, which will deliver hot flue gas to the dryer. We will also expedite procurement requisitions to ensure tagged equipment is delivered to the module fabrication shops and to the jobsite to meet the proposed module fabrication schedule and construction schedule – relying on heavy modularization. All equipment assumed to be installed "on-module" with exception of most packaged equipment and storage tanks.

Size & Weight / Numbers of Modules
A major deliverable of FEL3 is a complete module list with estimated weights (estimated 100+ modules). The Syngas unit has substantially larger equipment so module dimensions will be outside the ISO container dimensions. A separate contract has been issued by Mammoet to determine the max module dimensional and weight limitations for shipment to the jobsite. Gasification Unit contains 12 modules. Gasification Cleaning contains 18 modules.

Shop Locations
US Gulf Coast and International Fabricators were evaluated by Hargrove's procurement Team.

Dioxane Reduction Site Integration

Role: FEL, EPC (Design-Build)
Size: $27MM TIC
In order to reduce the dioxane content of its base material for a wide variety of retail products, Hargrove's client worked collaboratively with our team from FEI-1 through Detailed Design to complete a schedule-driven Ultra-Low Dioxane Reduction System (DRS) Technology Site Integration project. Two sites were selected for dioxane reduction projects, and our team was able to obtain some synergies from the activities in the first project in Georgia. The technology supplier provided equipment for its DRS technology, instruments and valves, several exchangers and various pumps within its system, and Hargrove's scope was "everything else" required to enable the DRS to function as intended – from electrical enhancements (substation, transformer, MCC, cabling, etc.) to feed/catch tanks, fenton reactors, cooling tower, pumps and various chemical storage tanks/vessels. We also supported the truck loading and unloading, blending systems, new steam header, and boiler house. The ISBL scope included truck loading/unloading, blending, three new product tanks, a high- shear mixing pump and manifold to allow it to enter the existing blending system, and the design and installation of a new steam header running 1500 ft. A major aspect of our execution was identifying opportunities for improving schedule and identifying risks that needed to be mitigated. Hargrove utilized our High-Value Engineering (HVE) office as well as our on Technical Services (TS) team on site (as their workload permitted) to assist the Houston-based home office team.

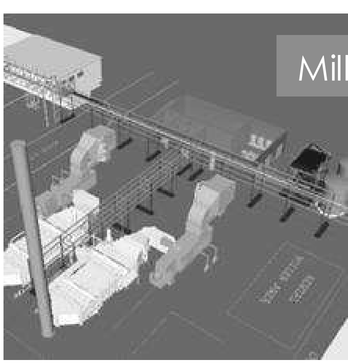
Power & Electrical Infrastructure

Site-wide Electrical Infrastructure

Role: FEL, E (In Progress)
Size: $130MM TIC
Hargrove is leading the effort to revamp the electrical infrastructure at a Baton Rouge area chemical plant. New infrastructure will be installed as a parallel system to the existing electrical distribution components which are degraded and obsolete. This is a multi-phase turnaround-driven project with safety in design as a major component. It includes 3 new substations,13.8kV feeder buildings, 21 MV & LV MCC Buildings, 3MW Emergency Generator, Ammonia Compressors, and connecting infrastructure. We are also leading the plant-wide fiber optic replacement, a plant-wide DCS replacement to a Delta V system, and designing three substation buildings. Hargrove tracked value-savings engineering for this project, and we have estimated a savings of $18.9MM dollars over initial design and TIC estimates for the $130MM project.

Substation Consolidation

Role: FEL, EPCm
Size: $200 MM TIC
Hargrove is currently executing a major substation upgrade at a Southeast refinery. This reliability-driven, estimated $200+MM effort includes a 5+ year plan to upgrade fourteen (14) 1960's era substations housed in ten (10) buildings in the blending area of the refinery. After reviewing several options, the team decided to combine the fourteen (14) substations into four (4) large substations, which would be elevated and constructed out of concrete masonry units. The project requires the design of multiple 15 kV switchgear line ups, double-ended 4160V switchgear/MCC buses, double-ended 480V switchgear line ups, 480V MCC line ups, associated transformers, and infrastructure. Engineering, procurement, and construction are divided in priorities so that overall multi-year cash flow goals can be achieved. The project began with surveying existing substations and loads to develop an overall list and provide preliminary sketches of routing for all major raceway routes, racks for new cable tray, support structures – above and underground, and power feeds.



Mill Power Independence

Role: FEL, E, C+A
Size: $75 MM TIC
After conducting several studies, the pulp and paper mill decided to install a combined heat and power (CHP) facility to supply steam and electricity independent of the current energy provider. Two new gas turbines with heat recovery steam generators in a greenfield power island was at the core of the scope with integration to the existing facility including redistribution of the 15kV power system, feedwater, ammonia storage, stage tanks, air systems, natural gas supply, and interconnecting piping and utilities. Hargrove also provided DCS integration and an operations building with control room, MCC, and utilities room

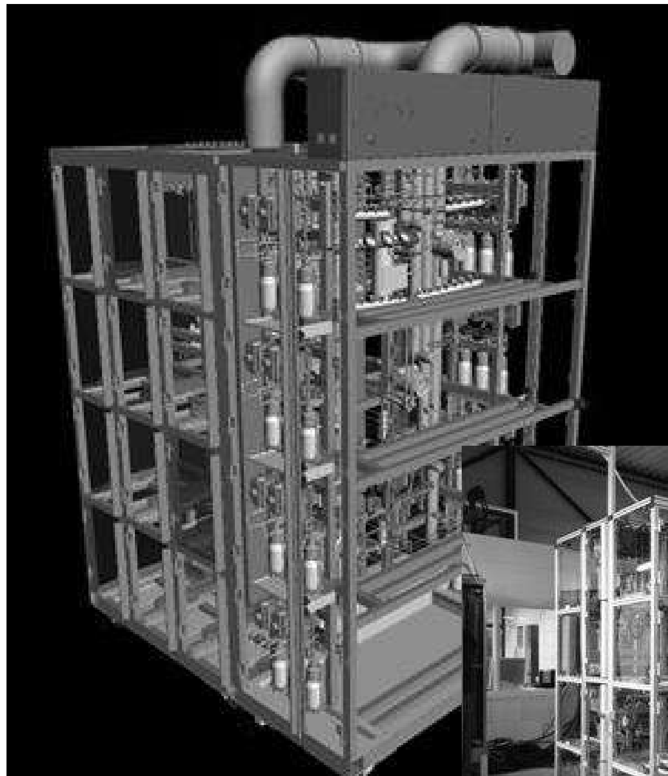
Demonstration, Pilot Plant, and Scale-up

Overview of Experience

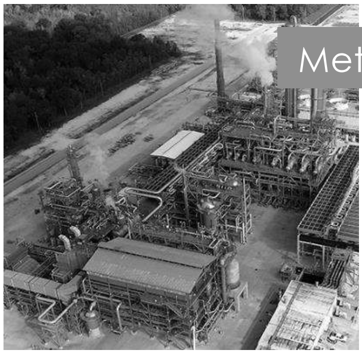
Process Technology and Pilot Plants

Hargrove works with our clients on conceptual based technology process demonstrations, evaluations, and selections, front end engineering including evaluation of alternatives and scope definition, and EPC project execution through detail design, procurement, construction and start-up/commissioning. Our team has significant experience in pilot plants and scale-ups.

We regularly Team with technology suppliers including UOP, Haldor-Topsoe, Alfa-Laval and others, aiding in the proper selection and implementation of licensed technology. This experience includes process technology evaluation and selection, as well as implementation and integration of supplier Schedule "A" type packages. We have completed project work as a partner to both the client and the technology supplier, as a purchaser of pre-engineered technology packages, and as a design and engineering firm contracted directly to technology supplier UOP to develop modular process units.



Carbon Neutral and Green/Sustainability-driven Projects



Methanol Unit Expansion with Recycled CO_2

Hargrove teamed with our US client and the technology provider to build a 130 KTA expansion to the Methanol Unit at a Texas operating facility. The 125% expansion project included new equipment based on process design from a global licensor of the technology. In the process, CO_2 is coming as a mix from three different sources, one with chloride (to be removed before the reactor) and two without chloride, so considerations had to be made in case any of these sources tripped. To convert organic chloride to inorganic chloride, hydrogen was added upstream of the chloride absorber, and to adjust the syngas module for the methanol loop, hydrogen was added down-stream of the chloride absorber to create considered the syngas needed by the Methanol Unit. Hargrove managed all technical evaluation and procurement of tagged equipment, instruments, and compressor packages, and this project was engineered, designed, and constructed independently of the other units. Utilizing recycled carbon dioxide (CO_2) as an alternative feedstock in the production of methanol, a key raw material in the manufacture of numerous acetyls products, including acetic acid, vinyl acetate monomer (VAM), ethyl acetate and other derivatives was key to meeting our client's sustainability goals. This carbon capture and reuse process is expected to produce sustainable methanol with a high capital efficiency.

Steam Methane Reforming (SMR) Hydrogen

The $200MM new Hydrogen plant was built at an existing Renewable Diesel plant that is strategically located on the U.S. Gulf Coast to meet the company's carbon neutral-goals. It has nameplate capacity exceeding 30 mmscfd hydrogen production and the capability to process a range of feedstocks, including renewable naphtha and other co-products from Renewable Diesel production, as well as natural gas. Hargrove worked alongside an engineering and procurement consultant to serve as General Contractor responsible for the overall construction management and subcontract administration. Our contract for General Construction was for $34MM with several subcontracts on Hargrove paper. The Hydrogen plant included reformer installation, flue gas stack, process gas cooling, underground stormwater piping, pipe fabrication, over 900 concrete piles, steel fabrication and installation, control room fabrication and installation, and onsite safety, quality, and construction administration over a 15-month schedule.

Renewable Diesel/Jet Fuel – Refinery Revamp

Our Gulf Coast client needed a new infrastructure and completed conversions to ISO-1 to process 100% renewable feedstock to provide cost-effective and profitable renewable diesel and sustainable aviation fuel without compromising the refinery operability. Hargrove developed of an initial +/- 50% TIC estimate and is currently bringing this project from conceptual design through EPCM.

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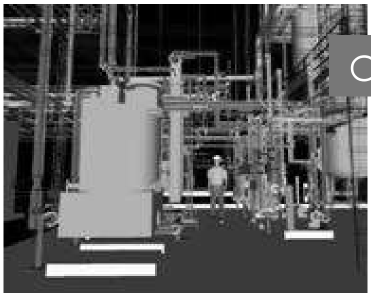
Greenfield Coal Gasification Plant

Hargrove supported a major Greenfield Integrated Gasification Combined Cycle plant constructed in Mississippi with startup support. More than 100 Teammates worked onsite supporting The Field Engineering, Construction Management, Chemical Engineering, Process Safety Management, Start Up, and Controls + Automation efforts. This project required quick response to fill critical positions, which we satisfied by transferring current Hargrove Teammates from our divisions. This technology uses syngas in the combustion turbine coupled with natural gas firing in the heat recovery steam generator (HRSG) to produce electricity – including key carbon capture technology elements. Hargrove Teammates were onsite at seven separate locations and have provided engineering services for 20 different plants from 4 of Hargrove's offices.

50-MW Waste Heat Recovery Power Plant

Hargrove served as construction managers for a project team with over 550,000 man-hours. We oversaw Hargrove team consisting of safety manager and safety coordinators, construction managers, document control and administrative assistance, project controls personnel. The scope included a new 40 MW renewable energy waste heat power plant consisting of a steam turbine generator, transformers and other auxiliary equipment on green field land adjacent to the carbon black facility. The steam generator was located within the carbon black facility and powered solely by waste heat from manufacturing operations and will produce all of the steam to drive the turbine with wet flue gas desulfurization system immediately downstream of the heat recovery steam generator. A selective catalytic reduction system was built within housing of the heat recovery steam generator. The desulfurization and selective catalytic reduction systems were solely for emissions controls from the carbon black manufacturing process. Overall project cost estimate $125 million.



Carbon Capture Technology Demonstration

Hargrove conducted the Conceptual Engineering and Detailed Design for a $5MM TIC carbon capture pilot plant. Our Team regularly supports Southern Company’s National Carbon Capture Research Center in Birmingham with supplemental engineering.

Biodegradable Plastics Scale-up Program

Equipment
Monomer Storage Tank
Monomer Storage Tank Pump
Monomer Dewater Vessel
Monomer Dewater Agitator
Monomer Dewater Pump
Monomer Preheater
BDO Pump
BDO Dewater Tank
BDO Vent Collection Skid
1,000 Gal Reactor
1,000 Gal Reactor Agitator
Reactor Vac Pump Skid
Reactor Condenser Skid
Melt Pump
Melt Pump 2 Skid
Screen Changer Skid
Pelletizer Skid
Spin Dryer
Classifier
Pellet Mixer Tank
Pellet Mixer Agitator
Pellet Packout Skid
Nitrogen Skid
Hot Oil Heater 1 and 2 Skids
Chilled Water System Skid

Scale Up Project – Biodegradable Plastics Technology
Size: $115MM TIC
Role: FEL, E, P
After supporting the process/pilot effort for the proof of technology, Hargrove teamed with our client and investors for the selection of a site in Kentucky for a Biodegradable Plastics Scale Up project where converted an abandoned industrial site. We supported the FEL2 and FEL3 for this scale-up effort including site selection, P&ID development, general arrangement, and equipment list, and continued to support detailed design, construction management, and commissioning and startup. Originally, we were looking at developing the facility at a Greenfield site, which brought the TIC estimate over $250MM, but with the help of Hargrove's Team, we brought down the total installed cost by using existing utilities and retrofitting some of the equipment. This heavy material handling project included high pressure gas systems, new mechanical agitators, pumps, tanks, extraction process equipment, piping bridge, filter presses, vacuum rotary dryer, pelletizer, solvent recovery system, chillers, cooling towers, boilers, RO systems, and ethanol storage tanks. The project also required extensive new electrical gear to power this equipment including MCCs, switchgear, boilers, and other utilities. Our Team led the controls and automation system integration scope with our in-house team as well as onsite construction management and commissioning and startup leadership. This project encompassed over total 100,000 hours with 5% high value engineering, representing a savings of over $700,000.

Greenfield PHA Plant – Full Production
Role: FEL, EPCm
Size: $500MM+ TIC
Hargrove is currently supporting the EPCm effort for a new 2,000,000-square-foot facility. This will be the largest plant making polyhydroxyalkanoate, a biodegradable plastic utilized in compostable products for food packaging and bottling, in the world. Hargrove led the FEL2 and FEL3 technology selection process and in the construction planning phase for the site, which will have a production rate of 63MM pounds neat PHA per year (pre-extrusion). The current process uses three (3) fermenters with an extrusion area designed for a production capacity of 126MM PPY of blended product, planning for the installation of four additional (4) extruders in the next phase. All civil/site development, buildings and infrastructure, process/mechanical engineering (with 400+ pieces of equipment), procurement, construction management, controls and automation system integration, startup and process safety are being conducted by Hargrove.

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Greenfield Boric Acid, Cogeneration, and Sulfuric Acid Plant (and Pilot)

We are currently executing FEL2 to deliver a +/-30% estimate for a $2B TIC greenfield boric acid plant with a production rate of 250 kta boric acid. The plant includes a 125 MW Co-generation Island as the Boric Acid Plants power and steam supply and a sulfuric acid plant designed by another contractor. As part of the expansion study, Hargrove performed the following activities: analysis of road infrastructure; developed 125 MW co-generation island to support the boric acid plant; feasibility and options to integrate of sulfuric acid plant designed by others; development of priced equipment list for process equipment needed in this scope such as crystallizers, waste effluent system, material handling, etc.; and performed a +/- 30% estimate on the scope needed to meet the stated production rate.

Prior to the $2B Greenfield plant, Hargrove designed a pilot plant and was able to repurpose the crystallizer and ZLD for two-stage crystallization, design the dewatering, drying, and impurity removal processes, and reuse existing design and equipment. This system consists of solution mining, solvent extraction, boric acid crystallization, gypsum precipitation, ZLD, utilities, and reagents – with the Boric Acid product being dried but not bagged for transport. The TIC for the small-scale facility was $20MM.

Fort Cady is designated at Critical Infrastructure by CISA and supported by US Congress and California State Legislature to provide critical and strategic materials to the challenged global supply chain.

Pilot to Production Reactor System

When two US chemical producers entered into a partnership to produce anti-wear products, they reached out to Hargrove for an Hargrove FEL 2 study to aid negotiations. Our FEL2 deliverables included a proposal for engineering, record drawings, construction management, programming, and startup and commissioning. The project entailed installing an industrial-scale reactor system scale up from a pilot plant reactor system currently onsite. Our scope included raw material storage tanks and their transfer pumps, product storage tanks, a vacuum system for the reactor, a thermal oxidizer to handle vapors from the reactor and tanks, a chiller system to condense chemicals out of the reactor vapor stream, a process waste tanks, a single-pass heat exchanger, and a tempered water system for the reactor jacket and single-pass heat exchanger. In addition, a new CMU MCC & E/I room and a warehouse/ drumming building was be installed and a new transformer will be installed to power the new facility.

Lithium Hydroxide Scale Up Plant

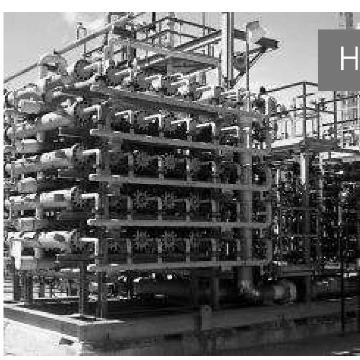
Hargrove is developing the FEL2 and FEL3 Engineering Packages and estimate for a new site to produce 15,000 MT/Yr of Lithium Hydroxide in the United States. Our scope includes site prep (including roads and drainage, parking, field fabrication shop and laydown areas, office trailers, fencing, guard house, etc.), permitting, boilers and electrical substation and infrastructure, rail spur, lime unloading and storage, raw material and finished product warehouse, and control buildings and labs. This project is a scale up of a known technology, and our team is working closely with the client Process Technology group for the life of the project. This cost driven project is estimated at below $250MM TIC with value engineering and modularization a prime factor in development. The ISBL scope is divided into wet end and back end (crystallization, drying, and packaging). The development of this plant is utilizing synergies from the 5,000 KMT unit located onsite. Key concerns for this project are 100% containment of lithium solutions, waste minimization, dust containment, metallic contamination, and scaling. Hargrove's in-house bulk material handling expertise and estimating capability were major factors for selection for this project.

Emissions Mineralization / Pilot Testing Projects

Hargrove has an ongoing relationship with a Calcium Chloride and Lithium and Bromine Mineral Acreage technology provider. Recent projects include a calcium chloride fluidized bed dryer, bromine ISO unloading project, and a calcium bromide recovery project, which includes the development of alternate processes to recover additional product for the filter process cake, pilot testing of the alternates, technical evaluation of the results, preliminary engineering and TIC estimate for the selected alternate. We've also managed a sodium bromide alternate raw material project for their sodium bromide production facility. Additional support includes warehouses, PHA facilitation, equipment repairs, lime handling, and structural retrofits.

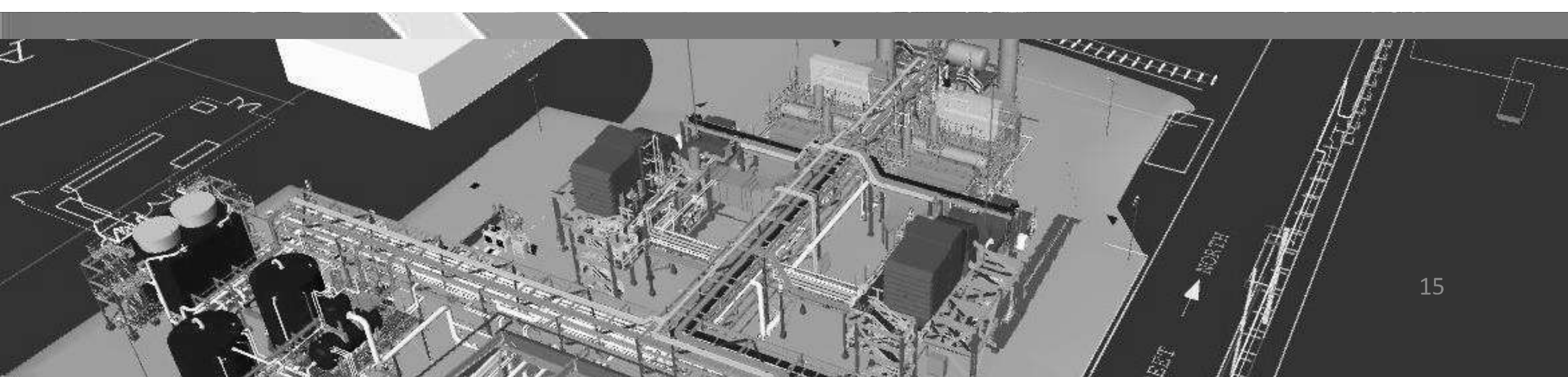
Divided Wall Column Technology

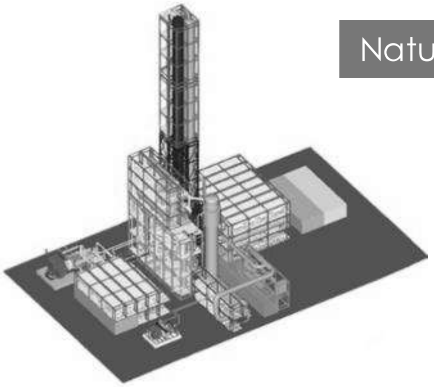
Hargrove provided FEL-0 project development support for a Parallel Sat Gas Plant Project for long range planning purposes. Working with a process design basis supplied to the refinery by GTC Technology, Hargrove developed the OSBL scope and used Aspen Estimating Software to model the unit and formulate an order of magnitude cost estimate. Divided Wall Column Technology formed the design basis for this proposed unit, and details and pricing on column internals were provided by the technology supplier.



Hydrogen Recovery

Hargrove supported the FEL to provide incremental hydrogen to meet future refinery needs. The refinery was considering purchase of hydrogen via pipeline from a commercial supplier, which requires a long-term capital lease. The FEL-0 study considered two alternatives for hydrogen supply with a TIC range of $70MM - $90MM to support a high level review of the best value option. The alternatives considered were hydrogen recovery from FCC offgas by installing a Hydrogen Recovery Unit on the LERU export gas stream and hydrogen generation with a Steam-Methane Reformer (SMR). The TICs for both options were developed using Aspen Icarus Capital Cost Estimator.





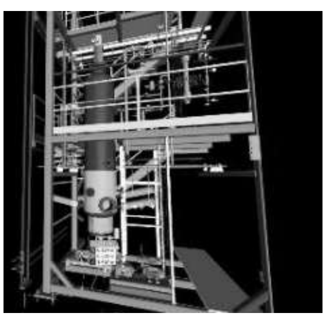
Natural Gas to Methanol

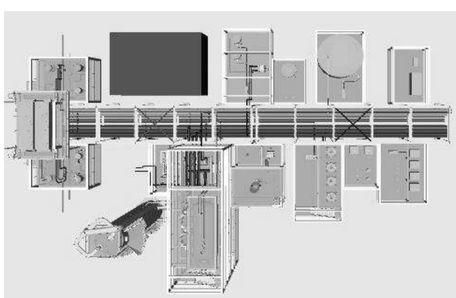
Hargrove is currently supporting the FEL effort for an estimated $120MM TIC small scale, modular process technology package for MeOH-To-Go™ working closely with our high value engineering center in Mexico. MeOH-To-Go™ (also referred to as Methanol-To-Go™) is designed to operate anywhere in the world and based on its modular design, can be moved if needed. plants enable users to produce their own methanol output from associated, stranded, or pipeline gas. The plant is designed to be self-sufficient with respect to utilities so it can be operated as a stand-alone facility. The plant is also designed for remote operation.

Technology Transfer Projects

Hargrove has an ongoing relationship with a technology transfer firm that provides turn-key packages for manufacturing processes globally and assists with design package, pilot plant development, front end engineering design, and full project execution support. We work with their world-class engineers and chemists as a subcontractor to provide front end development expertise and as subject matter specialists on projects ranging up to $1B in total installed cost. Some of our recent projects have primarily been in China and include serving as:

- Process Lead for specialty chemical basic engineering package, including lethal service. The Hargrove Team created ASPEN Plus simulation, PFD’s, P&ID’s, and equipment datasheets.
- Glufosinate Plant, Agricultural Chemical Producer, 10kta, est. $400MM TIC
- Lead for agrochemical basic engineering package, including batch processing and glass lined reactors.
- Process flow diagrams. Equipment sizing, and P&ID development for Biofuels process plant for first of kind pilot plant basic engineering package.





Biofuels Pilot Plant

This Pilot Plant was a joint project between our petrochemical industry client, Research and development firm, and its Japanese Client. The Pilot Plant is located at the Client’s site in Japan - designed to process triacylglycerides-containing renewable oil feedstocks. Hargrove’s process team designed the site for maximum flexibility in order to allow for process variables scans under full recycle conditions. Our scope included all inside battery limits biofuels process items including equipment spec sheets, process flow diagrams, piping/tubing sizes, electrical heater ratings, piping & instrumentation diagrams, preliminary plot plan, material balance information, utility requirements, and effluent stream compositions/rates as necessary for a Detailed Engineering Contractor to perform detailed design; procure all equipment; install/fabricate the battery limits equipment inside a heated building.

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Project Execution Overview

Project Execution

Whether we are providing simple drawing packages or complex lump-sum-turn-key projects, our goal is to deliver a successful project. A project is only considered successful if it is executed safely, meets the client's expectations on performance and operating cost, is on-time, on budget, and- most importantly- provides a safe operating environment for their employees. To be able to be successful, we must have the right people on our team with the expertise our clients need. Beginning with the project kick-off, Hargrove strives to operate with a team mentality- the team consisting of Hargrove, client, suppliers, and contractors.

One of the main components of successful project execution is communication. Effective communication begins with a firm understanding of the scope. Hargrove seeks to see the "big picture" of every project in order to understand the client's objective. It is important to define the success factors, grasp the decision-making process, and understand the client's short and long-term goals, as well as how the new equipment or upgrades will affect their facility as a whole.

Once the project is underway, the Project Team will work together throughout the process. Hargrove will work with you to get a "buy-in" for the project approach. There will be an alignment of expectations, team building with the Hargrove and client teams and identification of key stakeholders. We do all of our designs with the end in mind- a smooth construction process and operations are key factors from the projects beginning.

At project initiation, Hargrove will put together a Project Execution Plan, consisting of the following:

- Project Management Plan
- Engineering Plan
- Procurement/Materials Plan
- Construction Plan
- Safety Plan
- Quality Plan
- Project Controls Plan
- Environmental Compliance Plan
- Completion/Commissioning Plan
- Closeout Plan

Hargrove participates in the Construction Industry Institute's Best Practices for Project Planning with the HP3- Hargrove Pre-Project Planning procedure. We always involve the client in the planning process to ensure satisfaction. We have extensive Project Planning, Scheduling, and Cost Estimating teams, who will work to meet your cost and schedule needs. Hargrove understands the importance of reporting, cost control, and an accurate schedule. An example of our Schedule and Cost Estimate are available.

We have the ability to hold interactive planning sessions, develop and define work scopes, provide risk analysis, hold integrated web-based schedule maintenance, and provide turnover coordination.

Project Execution Overview (Cont.)

In the process of estimating a project, the front end estimate is typically conceptual (order of magnitude). We run a risk analysis based on the data available at the time and assess its accuracy part by part. These factors enter into the accuracy level associated with the estimate. As development of the project progresses and as the scope and information becomes more defined, additional risk analyses are run to institute better accuracy with less contingency. We have successfully performed these Phase 2 type estimates a number of times for our clients. Typically, the numbers supported by more defined information are within the range of values determined by the estimate. However, when the estimates significantly vary, it is due to the preliminary scope and design information drastically changing.

ESTIMATE TYPE	ESTIMATE DESCRIPTION	PROJECT PHASE	INTENDED ACCURACY OF ESTIMATE
Class I	Order of Magnitude	FEL I	+/- 50%
Class II	Factored or Quantity Based	FEL 2	+/- 30%
Class III	Quantity Based	FEL 3	+/- 10%
Construction Control	Design Quantity Based	CONSTRUCTION	N/A

Hargrove will submit weekly reports and monthly reviews. An example of our weekly report, project action item list, meeting minutes, and monthly review are available if needed.

We also realize that in the project process, changes will occur. Project managers are trained to manage and expect change and are the front line in managing cost and quality. Because we have the client's best interests in mind, we seek to deliver our services with the best value. Our design engineers understand the effects of the project scale and guard against overdesign.

The establishment of clear and well-understood contracts and purchasing agreements is critical to successful execution. Our procurement professionals have the necessary experience and knowledge to qualify bidders, conduct a fair competition, and negotiate for maximum value by encouraging suppliers and contractors to discuss value-creating options. After award, they work with the project quality manager to set priorities for inspections and then coordinate the vendor surveillance program. Expediting is performed to assure delivery to the scheduled commitments. We understand vendor change requests and can provide cost reasonableness if necessary and administer any change orders. Close-out is performed only after a thorough verification that all work is complete and satisfactory.

When a project is completed, Hargrove Teammates will hold project closeout activities. They will submit all job books and record drawings and will hold a Lessons Learned.

Our Team is willing to do the small things that make clients' operations more efficient and sustainable, which lays the foundation for relationships that lead to success. We provide the greatest value when serving clients in long-term support relationships in multiple modes of service: in onsite support arrangements, in plant-level small projects and consulting roles, and in larger capital projects.

Our Capabilities

Hargrove can implement or manage your program from the handshake to the handoff, and beyond. Hargrove serves the process industries as a full-service engineering, EPC project execution, and controls + automation integration firm.

EPC Project Execution

Project Management

All Engineering Disciplines

Architectural

Industrial Hygiene / Environmental

Procurement + Expediting

Site Development / Master Planning

Estimating, Scheduling + Cost Control

Construction Management

Reliability + Mechanical Integrity

Advanced Work Packaging

Laser Scanning / Drone / Dimensional Control / GPR

Controls + Automation Integration

Panel Fabrication

Digital Transformation

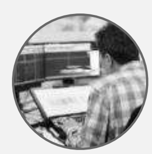
Process Safety

a hargrove company

Serving as stewards by safely providing value-driven and innovative solutions to assist our clients in achieving operational excellence.

Commissioning + Startup

Operations



Procedure Writing

Environmental, Health + Safety Services

Maintenance

Operator Training

For more information, please contact:

For more information, contact:
Vicki M. Studstill | Dir of Business Development
vstudstill@hargrove-epc.com | c: 251.751.4426

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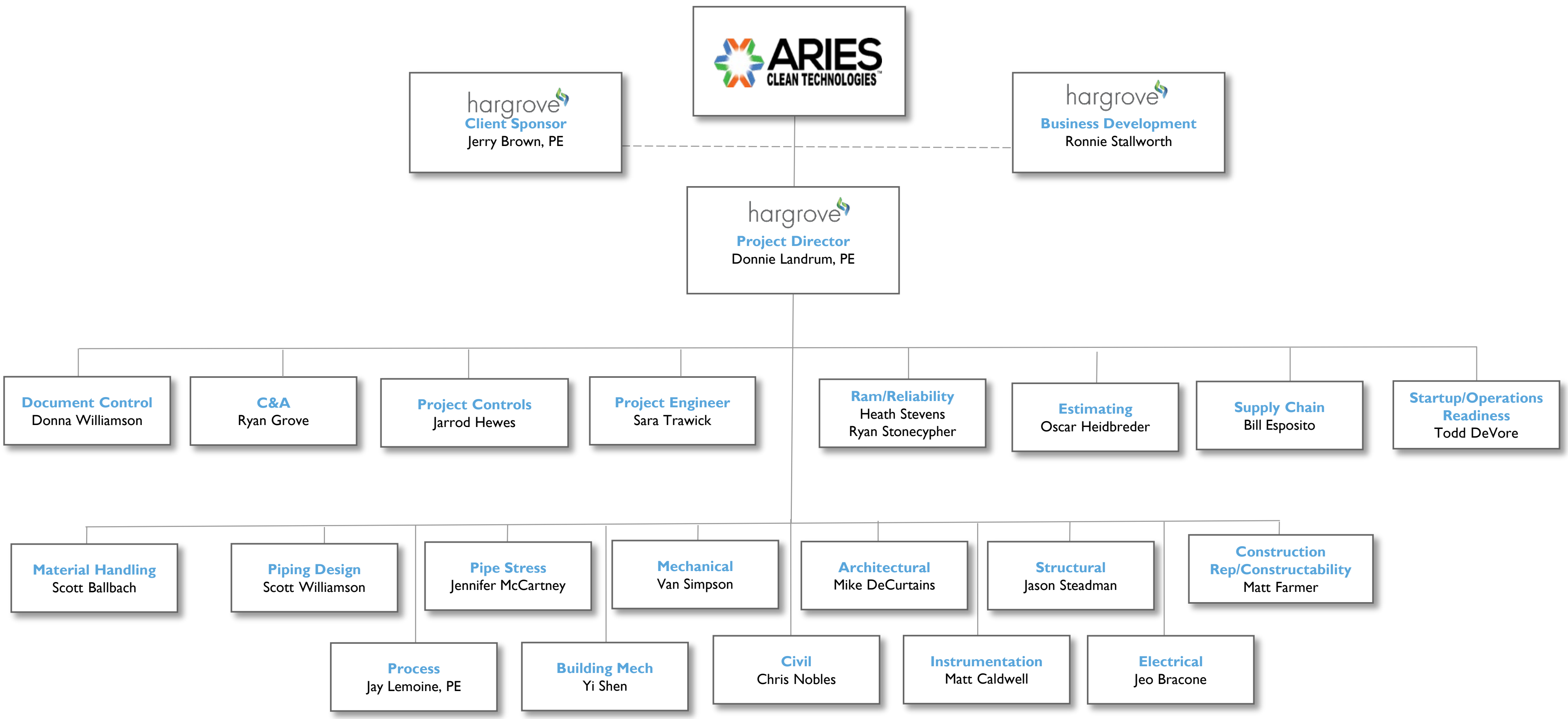

ARIES CLEAN TECHNOLOGIES
hargrove Client Sponsor
Jerry Brown, PE
hargrove Business Development
Ronnie Stallworth
hargrove Project Director
Donnie Landrum, PE
Document Control
Donna Williamson
C&A
Ryan Grove
Project Controls
Jarrod Hewes
Project Engineer
Sara Trawick
Ram/Reliability
Heath Stevens
Ryan Stonecypher
Estimating
Oscar Heidbreder
Supply Chain
Bill Esposito
Startup/Operations Readiness
Todd DeVore
Material Handling
Scott Ballbach
Piping Design
Scott Williamson
Pipe Stress
Jennifer McCartney
Mechanical
Van Simpson
Architectural
Mike DeCurtains
Structural
Jason Steadman
Construction Rep/Constructability
Matt Farmer
Process
Jay Lemoine, PE
Building Mech
Yi Shen
Civil
Chris Nobles
Instrumentation
Matt Caldwell
Electrical
Jeo Bracone

Teammate Name	Role	Email	Office Phone	Cell Phone
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Jerry Brown	Client Sponsor	Bbrown@hargrove-epc.com	(251) 375-5932	
Ronnie Stallworth	Business Development	Rstallworth@hargrove-epc.com	(224) 856-7166	
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Heath Stevens Ryan Stonecypher	Ram/Reliability	HStephens@hargrove-epc.com rstonecypher@hargrove-epc.com	(251) 459-8370	(850) 221-0047
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Jennifer McCartney	Pipe Stress	JMcCartney@hargrove-epc.com	(251) 375-5113	(251) 375-5113
Jesse Hays Harun Perez, PE	Mechanical	Jhays@hargrove-epc.com Hperez@hargrove-epc.com	 (251) 375-5810	(251) 622-6323 (251) 295-8524
Scott Peterson	Structural	Srpeterson@hargrove-epc.com	(864) 990-5412	(864) 906-2543

Teammate Name	Role	Email	Office Phone	Cell Phone
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Mike DeCurtains	Architectural	MDeCurtins@hargrove-epc.com		
Matt Farmer	Construction Rep	Mbfarmer@hargrove-epc.com		
Donna Williamson	Document Control	Dwilliamson@hargrove-epc.com		
Jay Lemoine, PE	Process	JLemoine@hargrove-epc.com		
Yi Shen	Building Mech.	YShen@hargrove-epc.com	(470) 509-3646	
Chris Nobles	Civil	Cnobles@hargrove-epc.com	(251) 375-5942	(251) 402-9035
Eric Johnson	Electrical	Ejohnson@hargrove-epc.com	(251) 375-5602	(251) 377-7296
Bill Sanford	Instrumentation	Bsanford@hargrove-epc.com		

Attachment W

CivCon Experience Profile

COMPANY ORGANIZATION

CIVIL CONSULTANTS is a professional consulting firm bringing together expertise from a variety of disciplines to provide a full scope of civil engineering and land surveying services.

The company was founded in 1977 and is based in South Berwick, Maine, and serves a wide range of clients, both public and private, including municipal, state & federal agencies, educational, commercial & industrial organizations, individuals and private developers.

In-house personnel have demonstrated experience and are highly qualified to assist clients in the following areas:

- *Bid Evaluation & Administration*
- *Boundary & Construction Survey*
- *Cartographic Compilation*
- *Commercial and Residential Site Development*
- *CADD Drafting*
- *Contract Bidding*
- *Construction Administration*
- *Construction Layout & Inspection*
- *Control Surveying (GPS & Conventional)*
- *Deformation Measurement*
- *Drainage Analysis and Design*
- *Environmental Assessments*
- *Industrial Site Development*
- *Municipal Plan Review*
- *Fiscal Impact Reports*
- *Permitting and Regulatory Application and Review*
- *Records Research*
- *Roadway Design*
- *Structural Engineering*
- *Topographic Mapping*
- *Volumetric Surveys*

CIVIL CONSULTANTS maintains relationships with professionals and consultants that can provide a range of additional services in the areas of electrical engineering, mechanical engineering, traffic engineering, soil mapping, wetlands mapping, wildlife studies, and hydrogeologic and geologic analysis.

Members of CIVIL CONSULTANTS hold professional engineering licenses in New Hampshire, Maine, Rhode Island, Vermont and Connecticut, with surveying licenses in New Hampshire and Maine and are members of numerous professional societies and associations.

The staff at CIVIL CONSULTANTS also takes an active part in community concerns through memberships on local City/Town boards and Commissions as well as civic groups.

Attachment X

Credere Experience Profile

GENERAL CAPABILITIES STATEMENT

Community Economy Environment

Credere Associates, LLC

776 Main Street
Westbrook, Maine 04092
(207) 730-1039
Email: rpatten@crederellc.com

Certified SBA WOSB Woman Owned Small Business

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Credere Associates, LLC

Credere is Italian for "to believe" and at Credere Associates, LLC (Credere) we believe that the path to true prosperity is realized when community revitalization, economic development, environmental remediation, and engineering are combined. Credere was formed in 2007 by Theresa and Rip Patten as an environmental and geotechnical engineering and consulting firm specializing in assessing, managing and resolving environmental challenges that complicate remediation, construction, and redevelopment projects.

Our work helps to resolve significant, complex environmental issues at federal government, Department of Defense (DoD), Formerly Utilized Defense Sites (FUDS), Superfund, and EPA-funded Brownfields properties being investigated or remediated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), and Toxics Substances Control Act (TSCA).

Throughout our 15+ year history, Credere has established a proven track record for:

- Reliably executing high quality work in accordance with contract performance standards
- Performing work in remote areas, extreme weather conditions, and in high-risk environments
- Strict adherence to safety and quality control procedures
- Consistently meeting budgets and schedules

SMALL BUSINESS INFORMATION

Credere is a former SBA certified 8(a) disadvantaged small business (graduated in 2024) and is currently a SBA certified Woman Owned Small Business (WOSB).

Credere is a small business under the following NAICS Codes:

238910	Site Preparation Contractors
541330	Engineering Services
541350	Building Inspection Services
541620	Environmental Consulting Services
541690	Other Scientific and Technical Consulting Services
541715	Research and Development in the Physical, Engineering, and Life Sciences
541990	All Other Professional, Scientific, and Technical Services
562910	Remediation Services

GSA Schedule Contract #: 47QRAA18D005L (00CORP)
GSA OASIS+ Contracts: 47QRCA25DA089 (8a); 47QRCA24DW191 (WOSB)
UEI: XSL5LUMQL6U5;
CAGE #53PS6

CREDERE ASSOCIATES, LLC

TECHNICAL SERVICES

Credere's services include:

- CERCLA/RCRA Remedial Investigations
- Hazardous Building Material Surveys (asbestos, PCBs, lead-based paint, universal wastes, mold)
- Building Abatement and Demolition (JV w/ EnviroVantage)
- Natural Resource Inventories
- Wetlands Delineation & Permitting
- NEPA Compliance
- R&D Support / Staff Augmentation
- TSCA-Regulated PCB Remediation
- Brownfields Assessments and Cleanups
- Environmental General Contracting
- Cleanup Oversight, Documentation, and Closure
- Environmental Site Assessments
- Long-term Groundwater Monitoring, Optimization & Reporting
- Treatment System Operation & Maintenance (O&M)
- Geotechnical Evaluations/Engineering

Gould Island RI/FS