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DELTA REPORT

10-K

ARQ - ADVANCED EMISSIONS SOLUTI
10-K - DECEMBER 31, 2023 COMPARED TO 10-K - DECEMBER 31, 2022

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TOTAL DELTAS	4361
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United States
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-K

☒ ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2022 December 31, 2023

or

☐ TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

Commission File Number: 001-37822

Advanced Emissions Solutions, Inc. ARQ, INC.

(Name of registrant as specified in its charter)

Delaware
(State of incorporation)

27-5472457
(IRS Employer
Identification No.)

8051 E. Maplewood Ave, Suite 210, Greenwood Village, CO, 80111
(Address of principal executive offices) (Zip Code)

(Registrant's telephone number, including area code): (720) 598-3500

Securities registered under Section 12(b) of the Act:

Class	Trading Symbol	Name of each exchange on which registered
Common stock, par value \$0.001 per share	ADES ARQ	Nasdaq Global Market

Securities registered under Section 12(g) of the Act: None

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. ☐ Yes ☒ No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. ☐ Yes ☒ No

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. ☒ Yes ☐ No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). ☒ Yes ☐ No

Indicate by check mark if disclosure of delinquent filers in response to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer or a smaller reporting company. See definition of "large accelerated filer," "accelerated filer" and "smaller reporting company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input type="checkbox"/>	Accelerated filer	<input checked="" type="checkbox"/>
Non-accelerated filer	<input checked="" type="checkbox"/>	Smaller Reporting Company	<input checked="" type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C. 7262(b)) by the registered public accounting firm that prepared or issued its audit report. ☒

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements. ☐

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b). ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act.) ☐ Yes ☒ No

The aggregate market value of the voting stock held by non-affiliates of the registrant was approximately \$75.5 million \$45.8 million based on the last reported bid price of the Common Stock on the Nasdaq Global Market on June 30, 2022 June 30, 2023. The number of shares outstanding of the registrant's Common Stock, par value \$0.001 per share, as of February 24, 2023 March 5, 2024 was 26,824,177.

33,238,436.

Documents Incorporated By Reference

Portions of Part III of this Form 10-K are incorporated by reference from the Registrant's definitive proxy statement to be filed with the Securities and Exchange Commission no later than 120 days after the end of the Registrant's fiscal year.

ADVANCED EMISSIONS SOLUTIONS,

ARQ, INC.
ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2022 2023

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PART I

Item 1. Business

General

Arq, Inc. ("Arq", the "Company," "we," "us", "our," or similar pronouns) is an environmental technology company principally engaged in the sale of consumable air, water, and soil treatment solutions including activated carbon ("AC") and chemical technologies. Our proprietary AC products enable customers to reduce air, water, and soil contaminants, including mercury, per - and polyfluoroalkyl substances ("PFAS") and other pollutants, to meet the challenges of existing and pending air quality and water regulations. We manufacture and sell AC and other chemicals used to capture and remove contaminants for the coal-fired power generation, industrial, municipal water and air, water and soil treatment and remediation markets (collectively, the advanced purification technologies or "APT" market).

Our predecessor, ADA-ES, Inc. ("ADA"), a Colorado corporation, was incorporated in 1997. Pursuant to an Agreement and Plan of Merger, effective July 1, 2013, the Company (formerly known as Advanced Emissions Solutions, Inc. ("ADES")), a Delaware company incorporated in 2011, succeeded ADA as the publicly-held corporation and ADA became a wholly-owned subsidiary of ADES, the Company. In 2018, we acquired ADA Carbon Solutions, LLC ("Carbon Solutions") as a means to enter into the broader activated carbon ("AC") AC market and to expand our product offerings in the mercury control industry and other applicable AC markets. In February 2023, we acquired 100% of the equity of the subsidiaries of Arq Limited (hereafter (the "Arq Acquisition," and hereafter the Arq Limited subsidiaries referred to as "Arq" "Legacy Arq") to secure access to a unique feedstock, a manufacturing facility and certain patented processes to manufacture new advanced granular activated carbon ("GAC") products for sale into markets to the APT and other markets. In February 2024, as part of a means larger rebranding, the Company changed its name to further expand Arq, Inc., and on February 1, 2024, our product offerings common stock commenced trading under the ticker symbol, "ARQ".

This Annual Report on Form 10-K is referred to as the "Form 10-K" or the "Report." As used in this Report, the terms the "Company," "we," "us" and "our" means ADES Arq, Inc. and its consolidated subsidiaries.

We sell consumable products that utilize AC Products and chemical-based technologies to a broad range of customers, including coal-fired utilities, industrials, water treatment plants and other diverse markets. Our proprietary technologies and associated product offerings provide purification solutions to enable our customers to reduce certain contaminants and pollutants to meet the challenges of existing and potential future regulations.

As of December 31, 2022 and 2021, we held equity interests of 42.5% and 50.0% in Tinuum Group, LLC ("Tinuum Group") and Tinuum Services, LLC ("Tinuum Services"), respectively, which are both unconsolidated entities, and through December 31, 2021, both contributed significantly to our financial position and results of operations. We account for Tinuum Group and Tinuum Services under the equity method of accounting. As a result of the expiration of Internal Revenue Code ("IRC") Section 45 - Production Tax Credit ("Section 45") refined coal tax credit program effective December 31, 2021, both Tinuum Group and Tinuum Services have substantially ceased operations as of December 31, 2021 and wound down their operations. Further, Tinuum Group is in the process of completing reclamation activities.

Markets

AC is a specialized sorbent material that is used widely in a host of industrial and consumer applications to remove impurities, contaminants and pollutants from gas, water, soil and other product or waste streams. AC is produced by activating carbonaceous raw materials, including wood, coal, nut shells, resins and petroleum pitch. Properties such as surface area, pore volume, surface chemical functionalities and particle size and form can be specifically engineered to selectively target various contaminants to meet end-use application requirements. Our AC can come products are manufactured in several different forms that are important for the end-use application, including powdered activated carbon ("PAC"), granular activated carbon, and colloidal carbon product ("GAC" CCP), pellets, honeycombs, blocks or cloths.

Key markets for AC products include removal of pollutants from coal-fired electrical generation and other industrial processes, treatment of drinking and waste waters, industrial acid and renewable gas purification and odor removal, automotive gasoline emission control, soil and ground water remediation and food and beverage process and product purification.

Demand for AC products has been, and is expected to continue to be driven by increasing environmental regulations pertaining to water, soil, and air purification, quality, especially in the developed and more industrialized areas of the world. world, and general consumer attention towards environmental issues. Additionally, we believe enhanced environmental and health advisory issues will continue to drive demand for AC in rapidly developing countries.

We see pursue opportunities to expand and are continuing to pursue diverse diversify our customer base into markets for our purification products outside of coal-fired power generation, including industrial applications, water treatment plants and other end markets. In addition, we see significant opportunities emerging in the soil, sediment and groundwater treatment markets. Increased environmental attention has been drawn to the monitoring and treatment of heavy metals, organic and inorganic compounds in groundwater to improve overall ground and drinking water quality across North America. AC, in various forms, has and will continue to play a key role in these remediation efforts.

Our Business

Our current products (also referred to as "consumables") are used to purify contaminated liquid, soil, and gas streams from a variety of industrial sources including coal-fired power plants and waste-water wastewater treatment plants and other end markets. Most of the North American coal-fired power generators installed equipment to control air pollutants, such as mercury, prior to or since the implementation of the Mercury and Air Toxics Standards ("MATS"). However, many power generators need consumable products to complement the operation of installed equipment on a recurring basis to chemically and physically more effectively capture mercury and other contaminants. AC has been adopted as the most widely-used technology to capture mercury due to product efficiency and effectiveness, and currently accounts for the majority of the mercury control consumables in the North American market. We offer AC and other chemical products and work with customers as they develop and implement a compliance control strategy which that utilizes the consumables solutions that fit with their unique operating and pollution control configuration.

Coal-fired power plants continue to be a significant, though declining, source of electricity generation in the United States ("U.S."). Demand for our AC products related to coal-fired electricity generation is highly dependent on the availability and cost of alternative energy sources, such as natural gas, solar and wind energy. We continue to pursue markets for our purification products outside of coal-fired power generation, including industrial applications, (such as waste-to-energy and cement making), water treatment and other markets.

For the purification of water, our AC has products have been used in the treatment of drinking water, wastewater, contaminated soil and groundwater to adsorb compounds causing unpleasant taste and odor and other toxic contaminants. Both industrial and municipal wastewater treatment plants have deployed the use of our AC products in their treatment processes. Groundwater contamination has become a matter of increasing concern to federal and state governments as well as to the public, especially over recent years. The U.S. AC market may see significant growth from water purification markets, especially if future regulations are passed controlling certain chemicals in drinking water. At present, individual states are primarily responsible for the protection of groundwater, groundwater and drinking water.

The existing technologies for treatment of groundwater, including removal of the soil for external treatment or landfill, pumping the groundwater above surface for treatment and/or installing treatment trenches or barriers are expensive all utilize PAC and may have complicated life-cycle management requirements. GAC products. An emerging technology generating increasing interest by site engineering firms and owners is injecting highly engineered ACs into the subsoil, also described as "in situ" treatment, to intercept the contamination plume or to treat the groundwater. In response to this market opportunity, in late 2021, we developed a new Colloidal Carbon Product ("CCP") platform, FluxSorb IS™, RC, which is currently in the initial stages of in-field field testing at multiple contaminated soil and groundwater remediation treatment sites.

Coal-fired power plants continue Legacy Arq Products and Markets

With the acquisition of Legacy Arq in February 2023, we now control bituminous coal waste reserves and own a manufacturing facility, both located in Corbin Kentucky (the "Corbin Facility"). Our facility will remediate these reserves, using a patented manufacturing process to be convert bituminous coal waste into a significant, though declining, source purified, microfine carbon powder known as Arq powder™ ("Arq Powder") for high value applications, such as for a raw material to produce GAC products. We expect by the end of electricity 2024 to begin using Arq Powder as a feedstock to produce high-quality GAC products for sale in the U.S. Demand APT and other markets.

We believe Arq Powder has additional potential for our AC products related us to coal-fired electricity generation is dependent on the availability access new markets and cost of alternative energy sources, applications. We expect to secure customer interest in Arq Powder as an additive into other markets, such as natural gas, solar and wind energy. We see opportunities components for asphalt. These products utilizing Arq Powder are expected to continue pursuing diverse markets for our purification have a lower carbon footprint compared to similar products outside utilizing conventional materials. These applications are currently in various stages of coal-fired power generation, including industrial applications, water treatment plants and other markets. proof of concept testing or preliminary customer testing.

Sales and Customers

Sales of We sell consumables are primarily made by the Company's employees to a range of end customers, including coal-fired utilities, industrial companies, water treatment plants though our internal sales group and other customers. Our AC sales are generally made under requirements-based contracts ranging from one to five years. Our chemical product sales are We generally made recognize revenue on an order by order order-by-order basis. Revenues Revenue from our top three customers comprised approximately 37% of our consolidated consumables revenues revenue for the year ended December 31, 2022 December 31, 2023, and the loss of any of these customers would have a material adverse effect on our operating results.

Norit Supply Agreement and Related Agreements Seasonality

On September 30, 2020, we and Cabot Norit Americas, Inc., ("Norit") entered into a supply agreement (the "Supply Agreement") pursuant to which we agreed to sell and deliver to Norit, and Norit agreed to purchase and accept from us, certain lignite-based AC products ("Furnace Products"). The term of the Supply Agreement is for 15 years with 10-year renewal terms that are automatic unless either party provides three years prior notice of intention not to renew before the end of any term.

Under the Supply Agreement, Norit also reimburses us for certain capital expenditures incurred by us that are necessary to manufacture the Furnace Products. Reimbursements are comprised of revenues earned from capital expenditures incurred that will benefit both us and Norit (referred to as "Shared Capital") and revenues earned from capital expenditures incurred that will benefit Norit exclusively (referred to as "Specific Capital"). In the event that Norit ceases to make purchases under the Supply Agreement, Norit is obligated to pay the balance of any outstanding payments for Specific Capital.

Further, under the terms of the Supply Agreement, Norit was obligated to pay us \$10.2 million of the certain reclamation costs (the "Reclamation Reimbursement") incurred under a reclamation contract entered into by us and a third party for full reclamation of the Marshall Mine (as defined below), inclusive of interest.

On February 25, 2022, we received \$10.6 million in cash from Norit (the "Norit Payment") as a result of a change in control provision in the Supply Agreement (the "Change in Control"), which occurred as a result timing of the sale of Norit our consumable products is dependent upon several factors. Power generation is weather dependent, with electricity and steam production varying in response to heating and cooling demands. As a result, our revenue is generally higher in our first and third fiscal quarters during the warmer and colder months of the year. Abnormally high and low temperatures during the summer and winter months, respectively, may significantly increase coal consumption for electricity generation and cause increased impurities within various municipalities' water sources, and thus increase the demand for our products. Additionally, power generating units routinely schedule maintenance outages in the spring and/or fall depending on the operation of their boilers. During the period in which an outage may occur, which may range from one week to over a month, our product sales may decrease.

Also, our revenue and sales volumes are highly dependent upon the level of coal consumption at coal-fired power plants, which in turn is significantly affected by its parent, Cabot Corporation. Under the Change prices of competing power generation sources, such as natural gas and renewables.

During periods of low natural gas prices, natural gas provides a competitive alternative to coal-fired power generation and therefore, coal consumption for power generation may be reduced, which in Control, we received turn reduces the demand for our products. In contrast, during periods of higher prices for competing power generation sources, coal consumption generally increases and thus demand for our products also increases.

In water purification, the sale of our products depends on demand from Norit full payment municipal water treatment facilities that use these products. Depending on weather conditions and other environmental factors, the summer months historically have the highest demand for our PAC products in water treatment. One of all amounts outstanding under the Reclamation Reimbursement, payment major uses for PAC is for the treatment of all unbilled amounts related taste and odor episodes caused by increased degradation of organic contaminants and natural materials in water that occurs during the summer months. Additionally, the rainy season generally results in more demand for PAC products to Specific Capital for expenditures incurred through February 28, 2022 and payment of \$0.8 million related to additional costs water municipalities due to the third-party operator of Marshall Mine (the "Norit Reclamation Costs"). Under the reclamation contract, we were obligated to remit payment for the Norit Reclamation Costs to the third-party operator of the Marshall Mine, rain run-offs and such payment was remitted in March 2022. The Change in Control did not impact any other provisions of the Supply Agreement. Additionally, under the Change in Control, we received \$1.3 million in advance of revenue to be recognized in future periods related to Specific Capital.

We believe the Supply Agreement will continue to provide material incremental sales volume and lower fixed operating costs on a per unit basis for our manufacturing plant located in Louisiana (the "Red River Plant"). Further, the Supply Agreement has expanded distribution of our AC products to additional markets outside of those we have traditionally

served, contaminant dilution.

Competition

Our primary competitors for consumable sorbent products in the AC consumables industry include Cabot Norit Americas, Inc., which is owned by One Equity Partners, Calgon Carbon, a subsidiary of Tokyo Stock Exchange listed which is owned by Kuraray Co., Ltd. and Donau Carbon Company. Our primary competitors for consumable chemical products include Midwest Energy Emissions Corp. (MEEC)

Sources and Nalco Holding Company, a subsidiary Availability of Ecolab Inc. (ECL).

Raw Materials

The Currently, the principal raw material we use in the manufacturing of AC is lignite coal, which is readily available. We source available through our 100% ownership of the a lignite coal to fulfill customer orders through our ownership of mine (the "Five Forks Mine") located in Saline, Louisiana. All production from the Five Forks Mine ("Five Forks"), is used in our manufacturing process. The Five Forks Mine is operated for us by a subsidiary of the North American Coal Company. We may also periodically purchase various ACs to supplement our inventory levels or to produce various products to serve certain AC markets. We purchase these various ACs through supply agreements or spot purchases with the producers.

With the Arq Acquisition, in 2023, we secured a second feedstock, Arq Powder, which is made from bituminous coal waste, used in manufacturing of GAC products. Through internal testing, we have demonstrated that Arq Powder can be shaped and successfully activated using industrially available equipment and technology with our proprietary know-how. Arq Powder has unique properties, including low levels of impurities and small average particle size, which when used as a feedstock to produce certain carbon products may provide for advantages compared to lignite coal, other bituminous coals, or oil-based feedstocks in terms of cost and performance. In the U.S., the availability of feedstock for GAC manufacturing is limited, as it is either supplied by specialty mined coal or coconut husks, which need to be imported. Between the Corbin Facility and the Five Forks Mine, we will have a fully integrated supply chain in multiple feedstocks - bituminous coal fines (Corbin Facility) and lignite coal (Five Forks Mine) to produce both GAC and PAC products.

We purchase various additives utilized in the production of AC. The manufacturing of AC is dependent upon these various additives, which are subject to price fluctuations and supply constraints. In addition, the number of suppliers who provide the necessary additives needed to manufacture our ACs is limited. We purchase these additives through supply agreements or spot purchases with the producers. Supply agreements with these producers are generally renewed on an annual basis.

We also purchase additives that are included in certain chemical products for resale to our customers through contracts with suppliers. The manufacturing of these consumable chemical products is dependent upon certain discrete additives, which are subject to price fluctuations and supply constraints. In addition, the number of suppliers who provide the necessary additives needed to manufacture our chemical products are limited. We purchase these chemical products through spot purchases with the producers.

Due to the nature seasonality of our business, and which is primarily driven by our high concentration of customers in the marketplace we operate in, there is an ebb coal-fired plant market, our sales and flow in demand for our product and consequently, our inventory levels may vary throughout the year. Across our business, there is at times a need We are able to supplement the available production at our Red River Plant by purchasing third party consumables to meet an increase in overall customer demand for our AC products. For example, for the year ended December 31, 2021, we observed significant increases in demand for our AC products that exceeded our available inventory and production capacity. As a result, we purchased third party products during 2021 and 2022 to supplement our current inventory and to increase our inventory balances to meet customer requirements. As demand for our product increases, we will increase our production, if available to do so, and, as necessary, continue to purchase additional inventory from third parties to meet our customer obligations. consumables.

Operations Facilities

We own and operate the Red a manufacturing plant (the "Red River plant, which is Plant"), located in Coushatta, Louisiana. We also lease land on which we operate a production and distribution facility located on land we lease in Louisiana. Additionally, Coushatta. In addition, we have sales, product development own and administrative operations located operate the Corbin Facility, where we process bituminous coal waste and apply patented technology to produce Arq Powder. In January 2024, the Company executed a contract with a third-party contractor for the construction of a GAC facility at the Red River Plant, (the "GAC Facility") and immediately commenced construction operations. The Company expects to complete commissioning activities at the GAC Facility by the end of 2024 and estimates that total construction costs including all equipment purchases will be in Colorado, the range of \$62 to \$67 million.

As of January 2024, major construction work at the Corbin Facility remains on track to be completed on time. We expect to commence commissioning activities during the first half of 2024 and estimate that total construction and commissioning costs at the Corbin Facility will be in the range of \$10 to \$15 million.

In 2020 and in conjunction with the execution of the Supply Agreement, March 2023, we purchased sold 100% of the membership interests in Marshall Mine, LLC, which owns owned a shuttered lignite mine located outside of Marshall, Texas (the "Marshall Mine"). We concluded that the Marshall Mine did not have any remaining economic reserves and independently determined to immediately commence activities to shutter it. Accordingly, on September 30, 2020, we entered into a reclamation contract with a third party for the full reclamation of the Marshall Mine. In September 2022, we entered into an agreement with a third-party to sell all membership interests in Marshall Mine, LLC. The obligations of the parties to close the sale transaction are subject to certain events, including (1) obtaining the approval of the Railroad Commission of Texas for an operating permit in the name of the buyer or an affiliate of the buyer, and (2) replacing our surety bond with a reclamation performance bond, letter of credit or other form of security to which the buyer or an affiliate of the buyer is the principal that is satisfactory to the Railroad Commission of Texas. We currently expect to close the sale transaction of the Marshall Mine during the first half of 2023, party.

Research and Development Activities

We have conducted conduct research and product development related to the customers and market that we currently serve or are pursuing. During activities for further enhancement of our consumables. For the years ended December 31, 2022 December 31, 2023 and 2021, 2022, we incurred research and development costs of \$0.4 million \$3.3 million and \$0.4 million \$2.1 million, respectively.

Legislation and Environmental Regulations

Our products and services are used for the reduction of pollutants and other contaminants. Legislation and regulation regulations limit the amount of pollutants and other contaminants permitted and may increase the need for our product, products. Below is a summary of the primary legislation and regulation that currently affects the market for our current products.

Federal MATS Affecting Electric Utility Steam Generating Units

The U.S. Environmental Protection Agency (the "EPA" ("EPA")) final "MATS Rule" went into effect in April 2012. The EPA structured the MATS Rule as a Maximum Achievable Control Technology-based ("MACT-based") hazardous pollutant regulation applicable to coal and oil-fired Electric Utility Steam Generating Units ("EGU"), which EGUs generate electricity through steam turbines and have a capacity of 25 megawatts or greater and provide for, among other provisions, control of mercury, control of acid gases such as hydrochloric acid and other Hazardous Air Pollutants ("HAPs"). Approximately 1,260 units in the U.S. were coal-fired EGUs when the rule was enacted. According to our estimates, the MATS Rule sets a limit that we believe requires the capture of 80-90% plus of the mercury in the coal burned in electric power generation boilers as measured at the exhaust stack outlet for most plants. The MACT-based standards are also known as National Emission Standards for Hazardous Air Pollutants ("NESHAP"). Plants generally had four years to comply with the MATS Rule, and implementation of the MATS Rule is now largely completed. We estimate that 52% 58% of the coal-fired units that were operating in December 2012 when the MATS Rule was finalized have been permanently shut down, leaving approximately 469 406 units in operation in the U.S. as of December 31, 2022 December 31, 2023.

In April 2017, a review by the U.S. Court of Appeals for the D.C. Circuit (the "D.C. Circuit") of a 2016 'supplemental finding' associated with the cost benefit analysis of the MATS Rule conducted by the EPA was stayed at the request of the Trump Administration. The court case continues to be stayed indefinitely. In May 2020, the EPA reconsidered and withdrew its 2016 "supplemental finding" associated with the cost benefit analysis of the MATS Rule. In this action, the EPA found that it was not "appropriate and necessary" to regulate HAPs emissions from coal- and oil-fired EGUs. However, the EPA expressly stated that the reconsideration neither removed coal- and oil-fired EGUs from the list of sources that must comply with the MATS rule, nor rescinded the MATS Rule, which has remained continuously in effect. ADES joined a number of parties in seeking review of this EPA action before the D.C. Circuit. President Biden identified the EPA's withdrawal of the supplemental finding as one of the actions to be reviewed for conformity with Biden Administration policy, and in February 2021, the Biden Administration moved that the pending judicial review of the supplemental finding withdrawal be held in abeyance. On February 9, 2022 February 15, 2023, the EPA published issued a new proposed final rule revoking the May 2020 withdrawal of the 2016 supplemental finding reconsideration and affirming that it is "appropriate and necessary" to regulate HAP emissions from coal- and oil-fired EGUs, which EGUs. On April 3, 2023, the EPA issued a proposed update to MATS that, amongst other potential modifications, proposed a reduction to the mercury emission limits for lignite coal-fired EGUs. This proposal is currently pending. The D.C. Circuit granted the Biden Administration's motion, and this appeal also is now in abeyance. The MATS Rule remains in effect.

State Mercury and Air Toxics Regulations Affecting EGUs

In addition, certain states have their own mercury rules that are similar to or more stringent than the MATS Rule. Coal-fired electricity generating units in the U.S. are subject to consent decrees that require the control of acid gases and particulate matter, in addition to mercury emissions.

U.S. Federal Industrial Boiler MACT

In January 2013, the EPA issued the final set of adjustments to the MACT-based air toxics standards for industrial boilers, including mercury, particulate matter and acid gas emission limits. Existing boilers typically had until January 31, 2017 to comply with the rule. On December 1, 2014, the EPA announced the reconsideration published an amended final rule of the industrial boiler MACT ("IBMACT") and proposed amendments to the version published January 31, 2013, representing technical corrections and clarifications. he proposed amendments do not affect clarifications. On July 21, 2022, the applicability EPA issued a further update of the final rule, IBMACT, which, among other things, updated emission limits to certain HAPs.

The EPA estimated that approximately 600 coal-fired boilers will be affected by IBMACT, in industries such as pulp and paper. Our estimates, based on conversations with plant operators, suggest that most of the affected plants have either shut down or switched fuels to natural gas to comply with the regulation.

Effluent Limitation Guidelines

In 2015, the EPA set the first federal limits known as effluent limitation guidelines ("ELGs") on the levels of toxic metals in wastewater that can be discharged from power plants. The final rule requires, among other things, zero discharge for fly ash and bottom ash transport water and limits on mercury, arsenic, selenium, and nitrate from flue gas desulfurization ("FGD") wastewater. In September 2017, the EPA finalized a rule that delayed the original compliance deadlines for certain wastewater streams from November 2018 to November 2020, with the possibility that plants would not need to comply until December 2023 with state approval. In April 2019, the U.S. Court of Appeals for the Fifth Circuit struck down the EPA's ELGs that apply to leachate wastewater and "legacy wastewater," and directed the EPA to revise the limits on the levels of toxic metals in those wastewater streams. In November 2019, the EPA proposed to revise the ELGs for bottom ash and FGD wastewater. The final rule, published in the Federal Register on October 13, 2020 and effective on December 14, 2020, does not directly regulate halogens. It does, however, propose to establish a voluntary incentives program for the removal of certain halides. In many (though not all) of the proposed treatment options that the EPA is considering, selenium in FGD wastewater would be regulated. Some halogens may impact the effectiveness of biological wastewater treatment systems that are often used for the removal of selenium. On August 3, 2021, the EPA initiated a supplemental rule-making initiative to strengthen certain discharge limits and stated its intention to issue a proposed rule for public comment in Fall of 2022, which has not yet been issued, and issued a proposed rule on ELGs for the Steam Electric Power Generating Category on March 29, 2023. This proposed rule seeks to establish more stringent discharge standards for certain wastewater generated at coal fired power plants, and is currently under review by the EPA.

Additional U.S. Legislation and Regulations

In 2015, October 2021, the EPA finalized rules released its PFAS Strategic Roadmap, laying out its approach to reduce greenhouse gases ("GHGs") in addressing PFAS and other pollutants. The PFAS Strategic Roadmap sets timelines by which the form of the Clean Power Plan ("CPP"), which established guidelines for states to follow in developing EPA plans to reduce GHG emissions take certain actions through 2024, including establishing a national primary drinking water regulation for certain PFAS and taking Effluent Limitations Guidelines actions to regulate certain PFAS discharges from fossil fuel-fired power plants. Under the CPP, states were required to prepare "State Plans" to meet state targets based on emission reductions from affected sources. The CPP was challenged by multiple states in the D.C. Circuit. The CPP was stayed by the U.S. Supreme Court. The D.C. Circuit held the CPP litigation in abeyance until April 28, 2017 industrial categories. On March 14, 2023, and dismissed the case once the EPA repealed proposed a National Primary Drinking Water Regulation ("NPDWR") for six specific PFAS substances. NPDWR seeks to establish legally enforceable maximum contaminant levels ("MCL") for the CPP in July 2019.

6 PFAS substances, including a proposed MCL for Perfluorooctane Acid ("PFOA") and Perfluorooctane Sulfonate ("PFOS") of 4.0 parts per trillion. Under this proposed rule, drinking water utilities would have three years from the publication of a final rule to comply. The EPA repealed the CPP and replaced it with the Affordable Clean Energy ("ACE") has submitted its final rule which established guidelines for states to follow in developing plans to reduce GHG emissions from fossil fuel-fired power plants. ACE also requires states to prepare State Plans and prescribes that they must be based on heat rate improvements at affected plants. Numerous states, power companies and non-governmental organizations challenged the ACE rule in the D.C. Circuit, which vacated the ACE rule on January 19, 2021. On February 12, 2021, EPA stated that neither the ACE or CPP regulations were in place with respect to GHGs the NPDWR for fossil fuel-fired power plants, interagency review and should issue a final rule after this review is completed.

International Regulations

There are various international regulations related to mercury control. In Canada, the Canada-Wide Standard ("CWS") was initially implemented in 2010, with increasingly stringent limits through 2020 and varying mercury emissions caps for each province. China and Germany both have limits for mercury emissions that are less stringent than U.S. limits and are typically met using co-benefits from other installed air pollution control equipment designed to control other pollutants. In May 2017, the EU ratified the Minamata Convention on Mercury, triggering mercury control regulations with implementation starting in 2021. Specific emissions limits for dust, nitrogen oxides (NOx), sulfur dioxide (SO₂), mercury and particulate matter (PM) are currently being developed, guided by the best available technologies reference ("BREF") document for limiting stack emissions and liquid effluents from industrial processes. The BREF conclusions for large coal-fired electricity generating units were adopted by the European Commission in July 2017.

In October 2022, the European Commission proposed new directives for better and more cost-effective treatment of urban wastewater, which included amongst other things new standards on micropollutants and new monitoring requirements for microplastics. In January of 2024, there was a provisional agreement that revised the October 2022 proposed directives. If the revised directive is adopted by the European Parliament and the Council, it will become enforceable on European Union Member States.

Based on the existing and potential regulations, we believe the international market for mercury control activated carbon products may expand in the coming years.

Mining, Environmental and Reclamation Matters

Federal, state and local authorities regulate the U.S. coal mining industry with respect to matters such as employee health and safety and the environment, including the protection of air quality, water quality, wetlands, special status species of plants and animals, land uses, cultural and historic properties and other environmental resources identified during the permitting process. Reclamation is required during production and after mining has been completed. Materials used and generated by mining operations must also be managed according to applicable regulations and law.

The Surface Mining Control and Reclamation Act of 1977 ("SMCRA"), establishes mining, environmental protection, reclamation and closure standards for all aspects of surface mining. Mining operators must obtain SMCRA permits and permit renewals from the Office of Surface Mining (the "OSM") or from the applicable state agency if the state agency has obtained regulatory primacy. A state agency may achieve primacy if the state regulatory agency develops a mining regulatory program that is no less stringent than the federal mining regulatory program under SMCRA. The Five Forks Mine operates in Louisiana, which has achieved primacy and issues permits in lieu of the OSM. The Marshall Mine operates in Texas, which has also achieved primacy and issues permits in lieu of the OSM.

Mine operators are often required by federal and/or state laws, including SMCRA, to assure, usually through the use of surety bonds, payment of certain long-term obligations including mine closure or reclamation costs, federal and state workers' compensation costs, coal leases and other miscellaneous obligations. Although surety bonds are usually noncancelable non-cancelable during their term, many of these bonds are renewable on an annual basis and collateral requirements may change. As of December 31, 2022, 2023, we posted a surety bond bonds of approximately \$7.5 million \$7.5 million and \$3.0 million for reclamation of the Five Forks Mine and \$16.6 million for the reclamation of Marshall Mine, Corbin Facility, respectively.

Patents Intellectual Property

As of December 31, 2022 December 31, 2023, we held 86 83 U.S. patents and 12 8 international patents that were issued or allowed, 13 additional U.S. provisional patents or applications that were pending, and two 2 international patent applications that were either pending or filed relating to different aspects of our technology. During the year ended December 31, 2023, we were granted 3 new patents, and obtained an additional 87 patents and patent applications through the Arq Acquisition. Within the Legacy Arq patent portfolio, there are 7 granted U.S. patents, 10 pending U.S. applications, 19 granted international patents, and 51 pending international patent applications. Our existing patents generally have terms of 20 years from the effective date of filing, with our next patents expiring in 2024.

Seasonality of Activities

The sale of our consumable products depends on the operations of the power generation units, industrial facilities and water treatment plants in which the applicable consumables are provided. Power generation is weather dependent, with electricity and steam production varying in response to heating and cooling needs. Additionally, power generating units routinely schedule maintenance outages in the spring and/or fall depending on the operation of the boilers. During the period year ended December 31, 2023, 7 U.S. and 6 international patents and applications from our patent portfolio were abandoned, as we determined that they no longer represent future markets or economic opportunities for us. Further, 22 international patents and applications from the Legacy Arq patent portfolio were abandoned in which jurisdictions that were determined to no longer represent future markets or economic opportunities for us.

As of December 31, 2023, we owned over 50 trademark registrations and applications globally. During the year ended December 31, 2023, we obtained an outage may occur, which may range additional 33 trademarks from one week to over a month, no consumables are used, and our sales may be correspondingly reduced.

The sale of our AC products for water purification depends on demand from municipal water treatment facilities that use these products. Depending on weather conditions and other environmental factors, the summer months historically have the highest demand for PAC, as one of the major uses for PAC is for the treatment of taste and odor episodes caused by increased degradation of organic contaminants and natural materials in water during the summer. Additionally, the rainy season causes more PAC usage for the municipalities due to rain run-offs and contaminant dilution resulting in higher water treatment volumes. Arq Acquisition.

Safety, Health and Environment

Our operations are subject to numerous federal, state, and local laws, regulations, rules and ordinances relating to safety, health, and environmental matters ("SH&E Regulations"). These SH&E Regulations include requirements to maintain and comply with various environmental permits related to the operation of many of our facilities, including mine health and safety laws required for continued operation of the Five Forks Mine.

Employees

As of December 31, 2022 December 31, 2023, we employed 147 173 personnel, 28 in Colorado and 119 in Louisiana, all of which 171 were employed full-time.

Entry into Material Definitive Agreements

Securities Purchase Agreement Arq Acquisition

On February 1, 2023 (the "Acquisition Date"), we entered into a Securities Purchase Agreement (the "Purchase Agreement") with Arq Limited ("Arq Ltd."), a company incorporated under the laws of Jersey, pursuant to which we acquired all of the direct and indirect equity interests of Arq Ltd.'s subsidiaries (the "Arq Acquisition," and hereafter referred to as "Arq" "Legacy Arq") in exchange for consideration (the "Purchase Consideration") totaling \$31.2 million and consisting of (i) 3,814,864 shares of the Company's common stock, par

value \$0.001 per share (the "Common Stock"), valued at \$12.4 million and (ii) 5,294,462 shares of the Company's Series A Convertible Preferred Stock, par value \$0.001 per share (the "Series A Preferred Stock"), valued at \$18.8 million.

In connection with

\$18.8 million. On June 13, 2023, our stockholders approved the issuance conversion of all of the outstanding shares of the Series A Preferred Stock pursuant to and the Purchase Agreement, we filed the Certificate corresponding issuance of Designations of Preferred Stock for the Series A Preferred Stock (the "Certificate of Designations") with the Secretary of State of the State of Delaware. Capitalized terms used herein but not otherwise defined have the meaning set forth in the Purchase Agreement. The Purchase Agreement contains customary representations, warranties and covenants. The Arq Acquisition closed concurrently with execution of the Purchase Agreement.

Under the terms of the Purchase Agreement, 833,914 5,362,926 shares of the Series A Preferred stock issued Common Stock.

On February 1, 2023, and pursuant to Arq Ltd. are being held in escrow (the "Escrow Shares") pending a determination by the Internal Revenue Service (the "IRS") that no tax withholding is required on the Purchase Consideration issued to Arq Ltd. (the "Arq Ltd. Tax Liability"). We have estimated the fair value of the potential Arq Ltd. Tax Liability at \$3.3 million.

We accounted for the Arq Acquisition as an acquisition of a business as of the Acquisition Date. The total Purchase Consideration was \$31.2 million and has been preliminarily allocated to the acquired assets and assumed liabilities of Arq based on their estimated fair values as of the Acquisition Date.

Arq's principal office is located in London, United Kingdom, with additional offices located in Lexington and Corbin, Kentucky near its main production facility. Arq is an environmental technology company that has developed a process for transforming coal waste into a purified, microfine carbon powder, known as Arq powder™ ("Arq Powder"), which can be used as an alternative to oil or in-ground mined coal to produce a range of noncombustible and combustible carbon-rich products. With the completion of the Arq Acquisition, we intend to utilize Arq Powder as a feedstock to produce high-quality AC for use in water and air purification markets as well as sell Arq Powder as an additive into other markets.

Series A Preferred Stock

Each share of Series A Preferred Stock will be automatically converted into a share of Common Stock upon approval by the holders of the percentage of Common Stock required to approve such conversion under the applicable rules of The Nasdaq Stock Market ("Nasdaq"), without the need for any action on the part of the holders of Series A Preferred Stock (the "Conversion Approval"). Each share of Series A Preferred Stock is deemed to have an original issue price of \$4.00 per share (the "Original Issue Amount"). The number of shares of Common Stock issued upon conversion of each share of Series A Preferred Stock shall be equal to the product of (i) the sum of (A) the Original Issue Amount plus (B) an amount equal to the cumulative amount of the accrued and unpaid dividends on such share at such time (regardless of whether or not declared or funds for their payment are lawfully available) divided by (ii) the Original Issue Amount, subject to adjustment as provided in the Certificate of Designations.

Holders of the Series A Preferred Stock are entitled to receive cumulative dividends which will accrue quarterly on the last day of each applicable quarter (whether or not declared or funds for their payment are lawfully available) and will be payable quarterly, in arrears, on the earlier to occur of (a) the date any dividend is paid to holders of Common Stock with respect to such quarter and (b) 30 days after the end of each quarter (the "Series A Quarterly Dividend") at the rate per share of Series A Preferred Stock equal to the greater of (i) if we declare a cash dividend on the Common Stock with respect to such quarter, the amount of the cash dividend that would be received by a holder of Common Stock in which such share of Series A Preferred Stock would be convertible on the record date for such cash dividend and (ii) an annual rate (the "Rate") of 8.0% of the Original Issue Amount per annum compounded quarterly (the "Coupon Dividend") with respect to such quarter. The Rate will increase by 2.0% on the first day of the first quarter ending on or after the 635th day following the closing date of the first issuance of Series A Preferred Stock and on each subsequent anniversary of such date.

The Series A Quarterly Dividend is payable in cash or in additional shares of Series A Preferred Stock (the "Series A PIK Shares"), at the Company's option. The number of Series A PIK Shares to be issued shall be determined by dividing (i) the Series A Quarterly Dividend payable with respect to all shares of Series A Preferred Stock held by a holder thereof by (ii) the aggregate Original Issue Amount of all shares of Series A Preferred Stock held by a holder thereof, and each fractional Series A PIK Share will be rounded to the nearest whole Series A PIK Share (with 0.5 of a share being rounded down to 0.0).

In the event of our liquidation, dissolution or winding up, after payment or provision for payment of our debt and other liabilities, a holder of Series A Preferred Stock will receive a liquidating distribution equal to the amount of the cumulative accrued but unpaid dividends on each share of Series A Preferred Stock held by such holder. After the payment to the holders of Series A Preferred Stock of such liquidation preference, the holders of outstanding shares of Series A Preferred Stock will participate *pari passu* with the holders of Common Stock on an as-converted basis in any remaining distributions out of the Company's assets available for distribution to stockholders.

Holders of shares of Series A Preferred Stock will generally have no voting rights. However, we are restricted from taking certain actions without the written consent or affirmative vote of the holders of at least a majority of the then outstanding shares of Series A Preferred Stock, including, but not limited to, consummating a merger with or into another party or a sale of substantially all of our assets; issuing Common Stock or instruments convertible into Common Stock representing more than 20% of our outstanding share capital to the extent the applicable issuance requires approval of holders of Common Stock pursuant to applicable law or the rules of the applicable stock exchange on which the Common Stock is listed; or authorizing, creating or issuing any Senior Stock or Parity Stock (each as defined in the Certificate of Designations) of the Company (or amending the provisions of any existing class of securities to make such class of securities Senior Stock or Parity Stock). In addition, we are restricted from amending our Certificate of Incorporation or Bylaws in a manner that adversely affects the rights of the Series A Preferred Stock without the written consent or affirmative vote of the holders of at least 75% of the then outstanding shares of Series A Preferred Stock.

If the Conversion Approval has not been obtained prior, each outstanding share of Series A Preferred Stock will be redeemed by us on February 1, 2028 for cash, at a redemption price equal to the sum of (i) the product of (x) 140% and (y) the Original Issue Amount, plus (ii) an amount equal to the cumulative amount of accrued and unpaid dividends on such share of Series A Preferred Stock.

Subscription Agreements

Also, on February 1, 2023, we entered into Subscription Agreements (the "Subscription Agreements") subscription agreements with certain persons (the "Subscribers"), which included existing shareholders of Arq Ltd., three of which were appointed to our board of directors, pursuant to which the Subscribers subscribed for and purchased 3,842,315 shares of Common Stock for an aggregate purchase price of approximately \$15.4 million and at a price per share of \$4.00 (the "PIPE Price Per Share" and such transaction, the "PIPE Investment"). The securities issued to the Subscribers under the Subscription Agreements were issued pursuant to an exemption from registration under Section 4(a)(2) of the Securities Act of 1933, as amended (the "Securities Act"), Rule 506 of Regulation D, which is promulgated thereunder, and Regulations S of the Securities Act. ADES The Company and its affiliates relied on this exemption from registration based in part on representations made by each of the Subscribers under the Subscription Agreements.

As a requirement of the Arq Acquisition, we appointed three new directors to our Board of Directors (the "New Directors"), each of whom was a director of Arq Ltd. and is considered a related party as of the Acquisition Date. Each of the New Directors individually and/or through their affiliated entities were Subscribers in the PIPE Investment.

Registration Rights Agreement

Pursuant to the terms of the Purchase Agreement, we entered into a Registration Rights Agreement (the "Registration Rights Agreement") with Arq Ltd. and the Subscribers to the Subscription Agreements described above. The Registration Rights Agreement provides that as promptly as practicable following the closing of the Arq Acquisition, but no later than 150 days after the Acquisition Date, ADES will file On January 25, 2024, we filed a registration statement registering on Form S-3/A with the resale of the shares of Common Stock received by Arq Ltd. as Purchase Consideration Securities and the Subscribers in the PIPE Investment (including Exchange Commission ("SEC") to register all shares of Common Stock issued upon in the Purchase Agreement, all shares of Common Stock issued in the PIPE Investments, and all shares of Common Stock issued from the conversion of all shares of the Series A Preferred Stock). ADES will also use commercially reasonable efforts to have such registration statement declared effective as soon as practicable following the filing thereof, but no later than the earlier of (i) the 210th calendar day (or 270th calendar day if the U.S. Securities and Exchange Commission (the "SEC") gives notice that it will review the registration statement) following the filing thereof and (ii) the 10th business day after the date the SEC gives notice that it will not review the registration statement. Stock subject to certain conditions. The the Registration Rights Agreement further provides that certain and 325,457 underlying shares of Common Stock issuable upon the exercise of the investors party thereto will be entitled to customary "piggyback" Warrant (as defined below) issued as consideration in the CFG Loan (as defined below). The registration rights.

was declared effective by the SEC on January 31, 2024.

Loan Agreement

On August 19, 2022 February 1, 2023, ADES and CF Global Credit, LP ("CF Global") executed a commitment letter pursuant to which CF Global offered to provide a \$10.0 million term loan (the "Term Loan") to us. The proceeds of the Term Loan are intended to be utilized for the general corporate purposes of ADES and its subsidiaries.

On February 1, 2023 (the "Closing Date"), ADES, Arq Acquisition, we, as borrower, certain of its subsidiaries, as guarantors, and CF Global Credit, as administrative agent and lender, entered into the Term Loan a \$10.0 million term loan (the "CFG Loan") upon execution of a Term Loan and Security Agreement (the "Loan Agreement"). Capitalized terms used herein but not otherwise defined have the meaning set forth in the Loan Agreement.

The Term CFG Loan has a term of 48 months and bears interest at a rate equal to either (a) Adjusted Term SOFR (subject to a 1.00% floor and a 2.00% cap) plus a margin of 9.00% paid in cash and 5.00% paid in kind or (b) Base Rate plus a margin of 8.00% paid in cash and 5.00% paid in kind, which interest on the Term CFG Loan in each case shall be payable (or capitalized, in the case of in kind interest) quarterly in arrears.

We are permitted to prepay the Term Loan at any time subject to the following prepayment premium: (i) prior to the twelve (12) month anniversary of the Closing Date, the Make-Whole Amount (as defined below), (ii) thereafter but prior to the thirty-six (36) month anniversary of the Closing Date, 2.00% of the outstanding principal amount of the Term Loan being repaid or prepaid or (iii) thereafter until the maturity date, 1.00% of the outstanding principal amount of the Term Loan being repaid or prepaid. The "Make-Whole Amount", with respect to any repayment or prepayment, is (i) an amount equal to all required interest payable (except for currently accrued and unpaid interest) on the aggregate principal amount of the Term Loan subject to such prepayment or repayment from the date of such prepayment or repayment through but excluding the date that is the first anniversary of the Closing Date calculated using an interest rate equal to (x) Adjusted Term SOFR for an interest period of one month in effect on the third U.S. Government Securities Business Day prior to such prepayment or repayment plus (y) 14.00% per annum and assuming all interest was paid in cash, plus (ii) a prepayment premium of 2.00% on the aggregate principal amount of the Term Loan subject to such prepayment or repayment.

The Term Loan is secured by substantially all of the assets of ADES and its subsidiaries, excluding those subsidiaries described in the agreement, subject to customary exceptions.

The Loan Agreement includes, among others, the following covenants: (1) beginning March 31, 2023 and as of the end of each fiscal quarter thereafter, ADES must maintain a minimum cash balance of \$5.0 million; (2) (x) as of December 31, 2023, for the fiscal year then ended, ADES must have a minimum annual revenue, on a consolidated basis, of \$70.0 million, (y) as of December 31, 2024, for the fiscal year then ended, ADES must have a minimum annual revenue, on a consolidated basis, of \$85.0 million and (z) for any fiscal year thereafter, ADES must have a minimum annual revenue, on a consolidated basis, of \$100.0 million; (3) (x) as of December 31, 2024, for the fiscal year then ended, ADES must have a minimum EBITDA of \$3.0 million and (y) for any fiscal year thereafter, ADES must have a minimum EBITDA of \$16.0 million; and (4) beginning after the fiscal quarter ending September 30, 2023, during an LTV Trigger Period, ADES must not exceed a loan to value ratio (based on the consolidated total assets of ADES and its subsidiaries) of 0.40:1.00.

In addition, in connection with the Loan Agreement and as consideration for the Term CFG Loan, ADES agreed to issue we issued to CF Global a warrant (the "Warrant") to purchase 325,457 shares of Common Stock. The Warrant has an exercise price of \$0.01 per share, subject to adjustment as set forth in the Warrant, is exercisable immediately, contains a cashless exercise provision and will expire expires on February 1, 2030. The terms of the Warrant do not allow for cash exercise, and the Warrant may only be exercised pursuant to the terms thereof. The Warrant was issued without registration under the Securities Act in reliance on the exemptions provided by Section 4(a)(2) of the Securities Act as transactions not involving a public offering and Rule 506 promulgated under the Securities Act as sales to accredited investors.

One of the New Directors is a principal of CF Global and both this director and CF Global are considered related parties as of the Acquisition Date.

Termination of Transaction Agreement

In connection with entry into the Purchase Agreement described above, that certain Transaction Agreement, dated August 19, 2022, by and among Elbert Holdings, Inc., Arq and ADES (the "Transaction Agreement") was terminated on February 1, 2023 pursuant to a termination agreement entered into by each of the parties to the Transaction Agreement. The Transaction Agreement would have provided, subject to its terms and conditions, for a business combination of Arq Ltd. and ADES. By virtue of the termination of the Transaction Agreement, the Transaction Agreement became void and of no further force or effect, with no liability of any party to the Transaction Agreement.

Arq Business

Overview

Arq is an environmental technology company that has developed a process for transforming coal waste into a purified, microfine carbon powder, known as Arq Powder, which can be used as an alternative to oil or in-ground mined coal to produce a range of carbon products or as a feedstock for AC. Additionally, Arq has developed a portfolio of additional product opportunities that include using Arq Powder as a component for asphalt, carbon black and power generation, that can achieve similar advantages in other large markets.

Arq has constructed a production facility at a large coal waste site in Corbin, Kentucky (the "Corbin Facility"). Arq processes coal mining waste and applies patented technology to produce Arq Powder, which has applications in a broad range of carbon products. Arq Powder has unique properties, including low levels of impurities and small average particle size, which when used as a feedstock to produce certain carbon products may provide for advantages compared to coal or oil-based feedstocks in terms of cost and performance.

Arq Powder is in development stage, and we do not expect it to be commercially sold until 2024 due to ongoing capital projects to improve the operating capabilities of the Corbin Facility. We believe the Arq Powder technology has several key environmental benefits: (1) it enables the remediation of waste land, (2) it displaces native coal production while producing valuable products, and (3) it may also have a lower environmental impact than conventional alternatives because Arq Powder is derived from reclaimed waste.

Strategy

We intend to first sell Arq Powder as a carbon filler for rubber composites and as a component for asphalt with an opportunity to evaluate expanding into other carbon products. These products utilizing Arq Powder are expected to have a lower carbon footprint compared to similar products utilizing conventional materials. These options are currently in various stages of proof of concept testing or customer testing.

As we complete capital upgrades to the Red River Plant, we intend to use Arq Powder as a bituminous based feedstock to produce high-quality AC for use in various markets.

Through internal testing, we have demonstrated that Arq Powder can be shaped and successfully activated using industrially available equipment, technology, and know-how. In the U.S., the availability of feedstock for GAC manufacturing is limited as it is either supplied by specialty mined coal or coconut husks which need to be imported.

We believe Arq Powder has the potential to open markets and applications for us, which were previously inaccessible to the lignite-based products made by ADES today. In addition, the Arq Acquisition enables us to have a fully integrated supply chain in multiple feedstocks - bituminous (Arq) and lignite (through the Five Forks Mine) to produce GAC and PAC.

Arq's Intellectual Property

Arq has 21 U.S. and foreign patents issued, with 63 pending patent applications. Arq's issued patents and pending patent applications span a variety of products and processes, including: fuel oil composition containing solid hydrocarbonaceous and carbonaceous particles; processes for fractionated product from crude oil containing solid hydrocarbonaceous particles; road asphalt feedstock; AC feedstock; anode binder pitch feedstock; needle coke feedstock; delayed coker feedstock; battery graphite feedstock; purified coal product process; and process for blending purified coal products with oils, including bio-components.

Arq also enforces its intellectual property across trademark, copyright, and trade secret matters to protect its intellectual property.

Available Information

Our periodic and current reports are filed with the Securities and Exchange Commission (the "SEC") SEC pursuant to Section 13(a) of the Securities Exchange Act of 1934, as amended (the "Exchange Act") and are available free of charge within 24 hours after they are filed with, or furnished to, the SEC at the Company's website at www.advancedemissionsolutions.com, www.arq.com. The filings are also available through the SEC at the SEC's Public Reference Room at 100 F Street, N.E., Washington, D.C. 20549 or by calling 1-800-SEC-0330. Alternatively, these reports can be accessed at the SEC's website at www.sec.gov. The information contained on our website shall not be deemed incorporated by reference in any filing under the Securities Act of 1933, as amended (the "Securities Act") or the Exchange Act.

Forward-Looking Statements Found in this Report

This Report contains forward-looking statements within the meaning of Section 27A of the Securities Act and Section 21E of the Exchange Act that involve risks and uncertainties. In particular such forward-looking statements are about our beliefs, plans, objectives, expectations, assumptions, future events or future performance contained in this report, including certain statements found in this Part I and under the heading in Part II, Item 7 below. Words below, are forward-looking statements. In some cases, forward-looking statements can be identified by words or phrases such as "anticipates," "believes," "expects," "intends," "plans," "estimates," "may", "predicts," the negative expressions of such words, or similar expressions, are used in this Report to identify forward-looking statements, and such forward-looking statements include, but are not limited to, statements or expectations regarding:

- (a) the anticipated effects from an increase in pricing of our AC products;
- (b) the anticipated effects from an increase in costs of our AC products and related cost increases in supply and logistics;
- (c) expected supply and demand for our AC products and services;
- (d) increasing competition in the AC market;
- (e) the effects of the Arq Acquisition;
 - (f) (e) the ability to successfully integrate Legacy Arq's business;
 - (g) (f) the ability to develop and utilize Legacy Arq's products and technology;
 - (h) (g) the ability to make Legacy Arq's products commercially viable;
 - (i) (h) the expected future demand of Legacy Arq's products;
 - (j) (i) future level of research and development activities;
 - (k) (j) future plant capacity expansions and site development projects; projects, including the GAC Facility;
 - (l) (k) the effectiveness of our technologies and the benefits they provide;
 - (m) (l) probability of any loss occurring with respect to certain guarantees made by Tinnium Group;
 - (n) (m) the timing of awards of, and work and related testing under, our contracts and agreements and their value;
 - (o) (n) the timing and amounts of or changes in future revenues, revenue, backlog, funding for our business and projects, margins, expenses, earnings, tax rates, cash flows, royalty payment obligations, working capital, liquidity and other financial and accounting measures;
 - (p) (o) the amount of future capital expenditures needed for our business and needed by Arq to fund its our business plan;
 - (q) (p) awards of patents designed to protect our proprietary technologies both in the U.S. and other countries;
 - (r) (q) the adoption and scope of regulations to control certain chemicals in drinking water and other environmental concerns;

- (s) (r) the impact of adverse global macroeconomic conditions, including rising interest rates, recession fears and inflationary pressures, and geopolitical events or conflicts; and
- (t) (s) opportunities to effectively provide solutions to U.S. coal-related businesses to comply with regulations, improve efficiency, lower costs and maintain reliability, reliability;
- (t) the impact of prices of competing power generation sources such as natural gas and renewable energy on demand for our products; and
- (u) bank failures or other events affecting financial institutions.

Our expectations are based on certain assumptions, including without limitation, that:

- (a) coal will continue to be a significant source of fuel for electrical generation in the U.S.;
- (b) we will continue as a key supplier of consumables to the coal-fired power generation industry as it seeks to implement reduction of mercury emissions;
- (c) we will be able to obtain adequate capital and personnel resources to meet our operating needs and to fund anticipated growth and our indemnity obligations;
- (d) Norit significant customers will continue to purchase Furnace Products consumables from us under the Supply Agreement in the quantities specified; us;
- (e) we will be able to establish and retain key business relationships with current and other companies;
- (f) orders we anticipate receiving will be received;
- (g) we will be able to formulate new consumables that will be useful to, and accepted by, the markets;
- (h) we will be able to effectively compete against others; and
- (i) we will be able to meet any technical requirements of projects we undertake, undertake; and
- (j) existing environmental regulations such as MATS stay in place.

The forward-looking statements included in this Report involve risks and uncertainties. Actual events or results could differ materially from those discussed in the forward-looking statements as a result of various factors including, but not limited to, timing of new and pending regulations and any legal challenges to or extensions of compliance dates of them; the U.S. government's failure to promulgate regulations that benefit our business; changes in laws and regulations, accounting rules, prices, economic conditions and market demand; impact of competition; availability, cost of and demand for alternative energy sources and other technologies; technical, start up and operational difficulties; competition within the industries in which the Company operates; our inability to commercialize our APT technologies products on favorable terms; our inability to effectively and efficiently commercialize new products; changes in construction costs or availability of construction materials; our inability to effectively manage construction and startup of the Red River GAC Facility or Corbin Facility; our inability to obtain required financing or financing on terms that are favorable to us; our inability to ramp up our operations to effectively address recent and expected growth in our business; loss of key personnel; ongoing effects of the inflation and macroeconomic uncertainty, including from the ongoing pandemic and armed conflicts around the world, and such uncertainty's effect on market demand and input costs; availability of materials and equipment for our business; intellectual property infringement claims from third parties; pending litigation; as well as other factors relating to our business strategy, goals and expectations concerning the Arq Acquisition (including future operations, future performance or results); the effect of the Arq Acquisition on our ability to hire key personnel; our ability to maintain relationships with customers, suppliers and other others with whom we do it does business and meet supply requirements, or our its results of operations and business generally; risks related to diverting management's attention from our ongoing business operations; the ability to meet Nasdaq's listing standards following the consummation of the Arq Acquisition; Transaction; costs related to the Arq Acquisition; opportunities for additional sales of our lignite AC activated carbon products and end-market diversification; the timing and scope of new and pending regulations and any legal challenges to or extensions of compliance dates of them; our ability to meet customer supply requirements; the rate of coal-fired power generation in the U.S., the timing and cost of capital expenditures and the resultant impact to our liquidity and cash flows as described in our filings with the SEC, with particular emphasis on the risk factor disclosures contained in those filings. You are cautioned not to place undue reliance on the forward-looking statements made in this Report and to consult filings we have made and will make with the SEC for additional discussion concerning risks and uncertainties that may apply to our business and the ownership of our securities. The forward-looking statements contained in this Report are presented as of the date hereof, and we disclaim any duty to update such statements unless required by law to do so.

Item 1A. Risk Factors

The following risks relate to us as of the date this Report is filed with the SEC. This list of risks is not intended to be exhaustive, but reflects what we believe are the material risks inherent in our business and the ownership of our securities as of the specified dates. A statement to the effect that the occurrence of a specified event may have a negative impact on our business, results of operations, profitability, financial condition, or the like, is intended to reflect the fact that such an event, if it occurs, would be likely to have a negative impact on your investment in ADES, Arq, but should not imply the likelihood of the occurrence of such specified event. The order in which the following risk factors are presented is not intended as an indication of the relative seriousness of any given risk.

Risks Related to Our Business

We are solely may be unable to meet our projected construction timelines, costs and production ramp up for our capital upgrades at our Red River Plant, or we may experience difficulties in generating and maintaining demand for products manufactured there.

Our ability to increase production of GAC on a sustained basis is dependent on earnings from the construction and ramp of upgrades at our consumables Red River Plant. The construction of and commencement and ramp of production at this facility are subject to a number of uncertainties inherent in all new manufacturing operations. These include ongoing liquidity requirements for funding the expansion of the facility, ongoing compliance with regulatory requirements, procurement and maintenance of construction materials and services, environmental and operational licenses and approvals for additional expansion, supply chain constraints, hiring, training and retention of qualified employees and the pace of bringing production equipment and processes online with the capability to manufacture high-quality GAC products to fund at scale.

If we experience any issues or delays in meeting our operations projected timelines, costs, or production capacity for the upgrades at the Red River Plant, or generating and need to substantially grow earnings from maintaining demand for the APT business. Future distributions from Tinnuum Group and Tinnuum Services will be insignificant.

The Section 45 tax credit period expired on December 31, 2021. As a result, both Tinnuum Group and Tinnuum Services have substantially ceased operations and products we received distributions from each through December 2022. We expect to receive limited distributions from each in 2023.

From an earnings standpoint, manufacture there, our business, must grow substantially, either organically or through acquisition. There can prospects, operating results and financial condition may be no assurance that we will be able harmed. The Company anticipates financing the timely completion of the upgrades to increase our earnings in 2023 Red River

Plant funded with cash on hand, cash generation, ongoing cost reduction initiatives, potential customer prepayments for GAC contracts, and beyond to cover our current operating expenses or to provide a return to shareholders that is comparable to the return that we previously provided while Tinnuum Group planned refinancing and Tinnuum Services were operating. We do not expect our overall selling, general and administrative portions potential expansion of our operating expenses to materially decrease in 2023. term loan. If we are not able to cover operating expenses, we could secure additional financing, the project timeline for our Red River Plant expansion may be forced to raise additional capital, significantly reduce our operating expenses or take other alternative actions. delayed beyond the end of 2024.

Our future financial results will suffer if we do not effectively manage our expanded operations following the Arq Acquisition.

Following the Arq Acquisition, the size of our business has increased. Our future results depend, in part, upon our ability to manage this expanded business, which will pose poses substantial challenges for management, including challenges related to the management and monitoring of new operations and associated increased costs and complexity. There can be no assurance that we will be successful or that we will realize the expected operating efficiencies, cost savings, revenue enhancements and other benefits currently anticipated from the Arq Acquisition.

The Manufacturing Legacy Arq's products and GAC products requires significant capital.

Legacy Arq Acquisition will require significant capital for us to manufacture Arq's products.

Arq is was a development stage entity that to date has not generated any revenues. revenue. Legacy Arq has historically had net operating losses and required multiple financing rounds to fund its business plan. We will require are currently spending significant capital to execute our business plan in order to manufacture Legacy Arq's products as a feedstock for GAC products. A significant funding source will be is our cash on hand. Our capital expenditure requirements include improvements We are targeting the end of 2024 for our first commercial production of Legacy Arq products and enhancements at the Red River Plant and Corbin Facility. Going forward there may be end of 2024 for our first commercial production of GAC products. To meet these production timing goals, we will need to raise additional capital expenditure requirements for the expansion of capacity at the Red River Plant and Corbin Facility. in 2024. We may not be successful in obtaining the required financing or, if financing is available to us, such financing may not be on terms that are favorable to us. The failure to obtain financing as necessary in 2024 in order to fund future capital expenditure requirements enable the Company to produce Legacy Arq products and GAC products by the end of 2024 could result in the a delay of the expansion of the Red River Plant and Corbin Facility and other manufacturing facilities. in executing our business plan.

The Arq Acquisition will require is requiring significant technological changes in manufacturing that may adversely affect the market acceptance of Legacy Arq's products.

We will be producing new products that we have not yet sold commercially. As such, production to date has not been at full throughput. Legacy Arq's new manufacturing technology has been extensively tested at scale, but continuous operations represent risks including an inability to achieve the scale-up efficiencies which that have been assumed in our business plan. In turn, this could impact throughput in the Corbin Facility, which could lead to lower production and higher operating costs. There is also risk of delays that are product-specific. For example, we may not receive adequate customer acceptance or achieve acceptable performance given the specification differentiation between some of Legacy Arq's products and the industry's existing conventional products. These risks could have a material adverse effect on our business, operating results and financial condition.

There could be no future demand for Legacy Arq's products.

Our primary market initial use for Arq Powder will be is as a feedstock for AC, and although we believe current conditions are favorable as a result of excess demand versus supply, there can be no guarantee that this will continue. Drivers of demand include factors beyond our control such as population growth and GDP growth, amongst others. Any major global downturn could also materially negatively impact this demand. New activated carbon AC supply is driven by new manufacturing sites being built, and we have little visibility on what additional manufacturing capacity other manufacturers may add in the future. Arq's

Our business plan and commercial success also assumes entry into new markets including additives for carbon black and asphalt. Although testing data and feedback from potential customers have been positive to date, Arq has had no sales of its products and there can be no assurance that these products will be commercially viable.

Our commercial success will depend on our ability to sell selling Arq Powder into new markets, including as an additive into the carbon black and asphalt markets. Although testing data and feedback from potential customers have been positive to date, there can be no assurance that these products will be commercially viable. As we attempt to develop and grow Arq Powder utilization worldwide, our success will depend on our ability to correctly forecast demand in these new markets. There is no assurance that we will be able to increase our business to meet targets globally, or that projections on which such targets are based will prove accurate, or that the pace of growth or coverage will meet customer expectations.

Our inability Disruptions at any of our facilities could negatively impact our ability to meet customer supply requirements due to damage to or insufficient production capacity of the Red River Plant and may have a material adverse effect on our business, results of operations and financial condition.

We own and operate a single activation-based manufacturing plant, the Red River Plant, which is our sole manufacturing plant for producing and selling AC products to our customers. customers, and are completing construction and commissioning activities on the Corbin Facility. Our current and future ability to meet customer expectations, manage inventory, complete sales and achieve our objectives for operating efficiencies depends on the full-time operation of the Red River Plant, and the execution of our business plan depends on the completion of the Corbin Facility and the GAC expansion at the Red River Plant. We cannot replicate our manufacturing methods at another plant due to the limited availability of similar manufacturing plants, the additional costs incurred in supplying raw materials such as lignite to another plant, and the risk of revealing our confidential and proprietary technologies and manufacturing processes.

If we experience a disruption at these facilities, due to natural disasters, extreme weather, other unanticipated problems such as labor difficulties, pandemics (including the Red River Plant was destroyed COVID-19 pandemic), equipment failure, cyberattacks or damaged in a significant manner, other cybersecurity incidents, capacity expansion difficulties or unscheduled maintenance, we would suffer a loss of inventory to supply customers, likely incur additional costs to deliver products to our customers, and disrupt the ordinary course of our business. In addition, if contractual demand exceeds manufacturing capacity, we would jeopardize our ability to fulfill obligations under our contracts, which could, in turn, result in reduced sales, profitability, contract penalties or terminations and damage to our customer relationships and could have a material adverse effect on our business. While we have insured the Red River Plant our facilities against damage or destruction as well as for losses from business interruptions, there can be no assurance that any insurance coverage will be sufficient to cover any such losses.

Further, a prolonged disruption in our operations at the Red River Plant due to downtime or having to meet customer requirements that exceed its our maximum manufacturing capacity would require us to seek alternative customer supply arrangements, which may not be on attractive terms to us or could lead to delays in distribution of products to our customers, either of which could have a material adverse effect on our business, results of operations and financial condition.

There can be no assurance that the Arq Acquisition will result in additional value for our stockholders or that the strategic evaluation process that we have undertaken will not have an adverse impact on our business. stockholders.

As previously disclosed, in 2021, our board of directors initiated a strategic review to assess a range of strategic alternatives to maximize shareholder value. We have incurred substantial expenses related to the this strategic review process and the Arq Acquisition. There can be no assurance that the Arq Acquisition will provide greater value to our stockholders than that reflected in the current price of our common stock. As a result of the Arq Acquisition, perceived uncertainties related to our future may result in the loss of potential business opportunities and volatility in the market price of our common stock, and which may make it more difficult for us to attract and retain qualified personnel and business partners.

In connection with the Arq Acquisition, we may be required to take write-downs or write-offs, restructuring and impairment or other charges that could negatively affect our business, assets, liabilities, prospects, outlook, financial condition and results of operations.

Although we conducted extensive due diligence in connection with the Arq Acquisition, we cannot assure you that this diligence revealed all material issues that may be present, that it would be possible to uncover all material issues through a customary amount of due diligence, or that factors outside of ADES' and Arq's control will not later arise. Even if our due diligence successfully identified certain risks, unexpected risks may arise and previously known risks may materialize in a manner not consistent with our preliminary risk analysis. Further, as a result of the Arq Acquisition, and the proposed operation of ADES going forward, we may be required to take write-offs or write-downs, restructuring and impairment or other charges that could negatively affect our business, assets, liabilities, prospects, outlook, financial condition and results of operations.

The failure to successfully integrate the Legacy Arq businesses of ADES and Arq in the expected timeframe could adversely affect our future business and financial performance.

The combination of two independent companies is a complex, costly and time-consuming process. As a result, we will be required to devote have devoted significant management attention and resources to integrate the Legacy Arq's business practices and operations of ADES and Arq. The integration process operations. We may disrupt the business of either or both of the companies and, if implemented ineffectively, could preclude realization of the full benefits expected by us. The failure by us to meet the challenges involved not be successful in successfully integrating the operations of Legacy Arq or otherwise realizing the anticipated benefits of the Arq Acquisition could cause an interruption to our business activities and could seriously harm our results of operations. Acquisition. In addition, the integration of Legacy Arq may result in material unanticipated problems, expenses, liabilities, competitive responses, loss of customer relationships and diversion of management's attention, and may cause our stock price to decline. The difficulties of combining the operations of ADES and Arq the two companies include, among others:

- managing a larger company;
- coordinating geographically separate organizations;
- the potential diversion of management's focus and resources from other strategic opportunities and from operational matters;
- performance shortfalls at one or both of the companies as a result of the diversion of management's attention caused by completing the Arq Acquisition and integrating the combined companies' operations;
- aligning and executing a new business strategy;
- retaining existing customers and attracting new customers;
- maintaining employee morale and retaining key management and other employees;
- the disruption of, or the loss of momentum in, each company's ongoing business or inconsistencies in standards, controls, systems, procedures and policies;
- integrating two unique business cultures, which may prove to be incompatible;
- the possibility of faulty assumptions underlying expectations regarding the integration process;
- consolidating corporate and administrative infrastructures and eliminating duplicative operations;
- coordinating sales, distribution and marketing efforts;
- maintaining R&D research and development technology momentum and lead leading customer technical collaboration progress;
- significant changes to current market conditions that may adversely affect the business plan;
- integrating IT, communications and other systems;
- changes in applicable laws and regulations;
- managing tax costs or inefficiencies associated with integrating the operations of ADES and Arq; Legacy Arq's operations;
- unforeseen expenses or delays associated with the Arq Acquisition; and
- taking actions that may be required in connection with obtaining regulatory approvals.

Many of these factors will be are outside of our control and any one of them could result in increased costs, decreased revenues revenue and diversion of management's time and energy, which could materially impact our business, financial condition and results of operations. In addition, even if the operations of Legacy Arq are integrated successfully, we may not realize the full benefits of from the Arq Acquisition, including the synergies, cost savings or growth opportunities that we expect. These benefits may not be achieved within the anticipated timeframe, or at all. As a result, we cannot assure you that the combination of ADES and Arq will result in the realization of the full benefits anticipated from the Arq Acquisition.

Specifically, the realization of the full benefits from the Arq Acquisition is dependent on our ability to construct new expansions to existing facilities and to integrate Arq's Arq Powder on the projected timeline and within the projected budget. If these anticipated capital expenditures are delayed, whether as a result of unanticipated challenges in permitting, construction or economic conditions, the cost of such activities may increase and the timing of projected revenues revenue may be impacted. Further, the costs of such construction activities may significantly exceed the costs included in the projections reviewed by ADES and Arq in connection with the Arq Acquisition, budgeted costs. The costs of construction or other anticipated capital expenditures are subject to the effects of the current inflationary environment and we may not be able to successfully offset the effects of inflation.

Strategic relationships upon which Arq relies on are subject to change, which may diminish our ability to conduct our operations.

Our ability to successfully produce Arq's products and expand their utilization as intended depends on developing and maintaining close working relationships with industry participants. In addition, the dynamics of maintaining these relationships with strategic partners may require us to incur expenses or undertake activities we would not otherwise be inclined to do. If these strategic relationships are not established or maintained, our business prospects may be limited, which could negatively impact our business and results of operations.

The synergies attributable to the Arq Acquisition may vary from expectations.

We may fail to realize the anticipated benefits and synergies expected from the Arq Acquisition, which could adversely affect our business, financial condition and operating results. The Acquisition. Our success of the Arq Acquisition will depend, in significant part, on our ability to successfully integrate the businesses of ADES and Legacy Arq business and realize the anticipated strategic benefits and synergies. We believe that the combination of the two businesses will allow us to enter into more diversified, higher margin markets with our products. However, achieving these goals requires, among other things, realization of the targeted cost synergies expected from the Arq Acquisition. These anticipated benefits and actual operating, technological, strategic and revenue opportunities may not be realized fully or at all, or may take longer to realize than expected. If we are not able to achieve these objectives and realize the anticipated benefits and synergies expected from the Arq Acquisition within the anticipated timeframe or at all, our business, financial condition and operating results may be adversely impacted.

Business issues currently faced by ADES Strategic relationships upon which we rely on are subject to change, which may diminish our ability to conduct our operations.

Our ability to successfully produce Legacy Arq's products and expand their utilization as intended depends on developing and maintaining close working relationships with industry participants. In addition, the dynamics of maintaining these relationships with strategic partners may require us to incur expenses or Arq undertake activities we would not otherwise be inclined to do. If these strategic relationships are not established or maintained, our business prospects may be imputed to the operations limited, which could negatively impact our business and results of the other.

To the extent either ADES or Arq currently has, or is perceived by customers to have, operational challenges, such as service performance, safety issues or workforce issues, those challenges may raise concerns by existing customers of ADES and Arq, respectively, which may limit or impede our future ability to obtain additional business from those customers, operations.

If we fail to develop or maintain an effective system of internal controls as we integrate Legacy Arq's business operations and processes with ours, we may not be able to accurately report our financial results or prevent fraud. As a result, stockholders could lose confidence in our financial reporting, which would harm our business and the trading price of our common stock.

Effective internal controls are necessary for us to provide reliable financial reports, prevent fraud and operate successfully as a public company. If we cannot provide reliable financial reports or prevent fraud, our reputation and operating results would be harmed. We cannot be certain that our efforts to develop and maintain an effective system of internal controls will be successful, will be able to maintain adequate controls over our financial processes and reporting in the future, or will be able to comply with our obligations under Section 404 of the Sarbanes-Oxley Act of 2002. Any failure to develop or maintain effective internal controls, or difficulties encountered in implementing or improving internal controls, could harm our operating results or cause us to fail to meet our reporting obligations. Ineffective internal controls could additionally lead to increased costs to remediate any failures and could cause investors to lose confidence in our reported financial information, which would likely have a negative effect on the trading price of our common stock.

The financial effects of Tinnuum Group providing indemnification under performance guarantees of its RC facilities are largely unknown and could adversely affect our financial condition.

Tinnuum Group, LCC ("Tinnuum Group"), of which we hold a 42.5% ownership interest, indemnifies certain utilities and lessees of RC facilities for particular risks associated with the operations and tax treatment of those facilities. We have provided limited, joint and several guarantees of Tinnuum Group's obligations under those leases. To date, we have not been required to make any payments under such guarantees and are not aware of any actual or threatened requests or claims for payment under such guarantees. Nevertheless, if any such obligations are triggered in the future, any substantial payments made under such guarantees could have a material adverse effect on our financial condition, results of operations and cash flows.

A pandemic, epidemic or outbreak of an infectious disease such as COVID-19 may materially adversely affect our business.

The global or national outbreak of an infectious disease, such as COVID-19, may cause disruptions to our business and operational plans, which may include (i) shortages of employees, (ii) inefficiencies, delays and additional costs in our manufacturing, sales and customer service efforts, (iii) recommendations of, or restrictions imposed by, government and health authorities, including quarantines, to address an infectious disease, such as the COVID-19 pandemic, and (iv) restrictions that we impose, including facility shutdowns, to ensure the safety of employees and others. The COVID-19 pandemic has had, and continues to have, a significant impact around the world, prompting governments and businesses to take unprecedented measures in response. While it is not possible to predict their extent or duration, these disruptions may have a material adverse effect on our business, financial condition and results of operations.

Demand for our products and services depends significantly on environmental laws and regulations related to emissions. Uncertainty as to the future of such laws and regulations, changes to such laws and regulations or granting of extensions of compliance deadlines has had, and will likely continue to have, a material effect on our business.

A significant market driver for our existing products and services and those planned in the future are existing and expected environmental laws and regulations, particularly those addressing the reduction of mercury and other emissions from coal-fired electricity generating units, units and proposed regulation of PFAS and other pollutants. If such laws and regulations are delayed, or are not enacted or are repealed or amended to be less strict, or include prolonged phase-in periods, or are not enforced, our business would be adversely affected by declining demand for such products and services. For example:

1. The implementation of environmental regulations regarding certain pollution control and permitting requirements has been delayed from time to time due to various lawsuits. The uncertainty created by litigation and reconsiderations reconsideration of rule-making by the EPA has negatively impacted our business, results of operations and financial condition and will likely continue to do so.
2. To the extent federal, state and local legislation mandating that electric power generating companies serving a state or region purchase a minimum amount of power from renewable energy sources such as wind, hydroelectric, solar and geothermal, and such amount lessens demand for electricity from coal-fired plants, the demand for our products and services would likely decrease.

Federal, state and international laws or regulations addressing emissions from coal-fired electricity generating units, climate change or other actions to limit emissions, including public opposition to new coal-fired electricity generating units, has caused and could continue to cause electricity generators to transition from coal to other fuel and power sources,

such as natural gas, nuclear, wind, hydroelectric and solar. The potential financial impact on us of future laws or regulations or public pressure will depend upon the degree to which electricity generators diminish their reliance on coal as a fuel source. That, in turn, will depend on a number of factors, including the specific requirements imposed by any such laws or regulations, the periods over which those laws or regulations are or will be phased in, the amount of public opposition and the state and cost of commercial development of related technologies and processes. In addition, **Public Utility Commissions ("PUCs")** public utility commissions may not allow utilities to charge consumers for, and pass on the cost of, emissions control technologies without federal or state mandates.

All of Arq's Our development operations will be at the Corbin Facility are subject to environmental permitting and regulations that can make operations expensive, or prohibit them altogether. Arq uses We use coal waste as its a feedstock to produce Arq Powder, and the majority of coal waste sites targeted by Arq us for development contain potential environmental liabilities. Arq therefore Therefore, we may be subject to potential risks and liabilities associated with pollution of the environment and the disposal of waste products that could occur as a result of its these development and production activities.

We Further, we cannot reasonably predict the impact that any such future laws or regulations or public opposition may have on our results of operations, financial condition or cash flows.

With the Arq Acquisition, we will be are subject to additional significant governmental regulations, which may negatively impact our operations and costs of conducting business.

Arq's The Corbin Facility's operations are governed by extensive laws and regulations, including:

- laws and regulations related to exports, taxes and fees;
- labor standards and regulations related to the MSHA; and
- environmental standards and regulations related to waste disposal, toxic substances, land use and environmental protection, including environmental protection regulations related to water and air.

Existing and possible future laws, regulations and permits governing operations and activities of energy waste companies, or more stringent implementation, could have a material adverse impact on our business and cause increases in capital expenditures or require abandonment or delays in our products. Any future regulations regarding CO₂ emissions of coal reclamation and product manufacturing could also impact our future business.

Action by the EPA related to Mercury and Air Toxics Standards ("MATS") that decreases demand for our mercury removal products could have a material adverse effect on our business.

Our operating performance is largely dependent upon demand for mercury removal-related product, which is largely affected by the amount of coal-based power generation used in the U.S. and the continued regulation of utilities under MATS. In May 2020, the EPA reconsidered and withdrew its 2016 "supplemental finding" associated with the cost benefit analysis of the MATS Rule. In this action, the EPA found that it was not "appropriate and necessary" to regulate Hazardous Air Pollutants ("HAP") emissions from coal- and oil-fired Electric Utility Steam Generating Units ("EGUs"). However, the EPA expressly stated that the reconsideration neither removed coal- and oil-fired EGUs from the list of sources that must comply with the MATS rule, nor rescinded the MATS Rule, which has remained continuously in effect. On February 9, 2022, the EPA published a new proposed rule revoking the May 2020 withdrawal of the 2016 supplemental finding and affirming that it is "appropriate and necessary" to regulate HAP emissions from coal- and oil-fired EGUs. On February 15, 2023, the EPA issued a final rule revoking the May 2020 reconsideration and affirming that it is "appropriate and necessary" to regulate HAP emissions from coal- and oil-fired EGUs. On April 3, 2023, the EPA issued a proposed update to MATS that amongst other potential modifications, proposed a reduction to the mercury emission limits for lignite coal-fired EGUs. Any final action taken by the EPA related to MATS that decreases demand for our products for mercury removal will have a negative effect on our financial results. The timing and content of the final reconsideration proposed updates to the rule are unknown.

Uncertain geopolitical conditions could adversely affect our business.

Uncertain geopolitical conditions, including the invasion of Ukraine, sanctions against Russia and other potential impacts on this region's economic environment and currencies may cause disruptions in our business. These include logistics delays or shortages in producing and shipping certain of our raw materials, increases in energy prices that could increase costs of certain of our raw materials, increases in transportation costs from overall higher gasoline prices and cyber-attacks targeted at U.S. power infrastructure that could impact demand for our products.

The failure of tariffs placed on U.S. imports of Chinese AC to adequately address the impact of low-priced imports from China could have a material adverse effect on the competitiveness and financial performance of our business.

Our business faces competition in the U.S. from low-priced imports of AC products. If the volumes of these low-priced imports increase, especially if they are sold at less than fair value, our sales of competing products could decline, which could have an adverse effect on our earnings. In addition, sales of these low-priced imports may negatively impact our pricing. To limit these activities, regulators in the U.S. have enacted an anti-dumping duty order on steam AC products from China. In 2018, November 2023, the order was extended for an additional five years. The amount of anti-dumping duties collected on imports of steam AC from China is reviewed annually by the U.S. Department of Commerce. To the extent the anti-dumping margins do not adequately address the degree to which imports are unfairly traded, the anti-dumping order may be less effective in reducing the volume of these low-priced AC imports in the U.S., which could negatively affect demand and/or pricing for our products.

The market for consumables and other products that provide pollutant reduction is highly competitive, and some of our competitors are significantly larger and more established than we are, which could adversely impede our growth opportunities and financial results.

We operate in a highly competitive marketplace. Our ability to compete successfully depends in part upon our ability to maintain a production cost advantage, competitive technological capabilities and to continue to identify, develop and commercialize new and innovative products for existing and future customers. We may face increased competition from existing or newly developed products offered by industry competitors or other companies whose products offer a similar functionality as our products and could be substituted for our products, which may negatively affect demand for our products. In addition, market competition could negatively impact our ability to maintain or raise prices or maintain or grow our market position.

We compete against certain Additionally, our competitors are significantly larger and/or more established companies in the market for consumables and other products that provide mercury emissions reduction, water treatment and air purification.

Reduction of coal consumption by North American electricity power generators could result in less demand for our products and services. If utilities significantly reduce the number of coal-fired electricity generating units or the amount of coal burned without a corresponding increase in the services required at the remaining

units, this could reduce our revenues revenue and materially and adversely affect our business, financial condition and results of operations.

The amount of coal consumed for North American electricity power generation is affected by, among other things, (1) the location, availability, quality and price of alternative energy sources for power generation, such as natural gas, fuel oil, nuclear, hydroelectric, wind, biomass and solar power; and (2) technological developments, including those related to competing alternative energy sources.

Natural gas-fueled generation and renewable energy generation have displaced and may continue to displace coal-fueled generation, particularly from older, less efficient coal-powered generators. We expect that a significant amount of the new power generation necessary to meet increasing demand for electricity generation will be fueled by these sources. The price of natural gas has remained relatively competitive for power generation and the use of natural gas is perceived as having a lower environmental impact than burning coal. Natural gas-fired plants are cheaper to construct, and permits to construct these plants are easier to obtain, and ongoing costs of natural gas-fired plants associated with meeting environmental compliance are lower. Possible advances in technologies and incentives, such as tax credits that enhance the economics of renewable energy sources, could make those sources more competitive than coal. Any reduction in the amount of coal consumed by domestic electricity power generators, whether as a result of new power plants utilizing alternative energy sources or as a result of technological advances, could reduce the demand for our current products and services, thereby reducing our revenues revenue and materially and adversely affecting our business and results of operations.

Additionally, long-term changes in environmental regulation that threaten or preclude the use of coal or other fossil fuels as a primary fuel source for electricity production may result in the reduction or closure of a significant number of coal-fired electric generating units, and may adversely affect our business, financial condition and results of operations.

The loss of, or significant reduction in, purchases by revenue from our largest customers could adversely affect our business, financial condition or results of operations.

For 2022, 2023, we derived approximately 51% 48% of our total consumable revenues revenue from our five largest customers. Our top three customers accounted for approximately 37% of our total consumable revenue for 2022, 2023. If any of our five largest customers were to significantly reduce the quantities of consumables they purchase from us, it may adversely affect our business, financial condition and results of operations.

Uncertain geopolitical conditions could adversely affect our business.

Uncertain geopolitical conditions, including the conflicts in the Middle East, the invasion of Ukraine, sanctions against Russia and other potential impacts on the world economy and currencies may cause disruptions in our business. These include logistics delays or shortages in producing and shipping certain of our raw materials, increases in energy prices that could increase costs of certain of our raw materials, increases in transportation costs from overall higher gasoline prices and cyber-attacks targeted at U.S. power infrastructure that could impact demand for our products.

Disruptions of supply chains may affect volatility in price and availability of raw materials.

The development continuation of geopolitical conflicts in 2022 2023 has contributed continued to disruptions of disrupt supply chains, resulting in cost increases for commodities, goods and services in many parts of the world. Significant disruptions Disruptions of supply chains and higher costs persisted in 2022 and may continue into 2023 2024 and beyond. The economic effects from these events over longer terms could negatively impact our business and results of operations.

The manufacturing and processing of our consumable products requires significant amounts of raw materials. The price and availability of those raw materials can be impacted by factors beyond our control. Our consumable products, exclusive of lignite coal, use a variety of additives. Significant movements or volatility in the costs of additives could have an adverse effect on our working capital or results of operations. Additionally, we purchase certain raw materials from selected key suppliers. While we have inventory of such raw materials, if any of these suppliers are unable to meet their obligations with us on a timely basis or at an acceptable price, we may be forced to incur higher costs to obtain the necessary raw materials or be unable to obtain the materials.

We may attempt to offset the increase in raw material costs or challenges in the supply of raw materials with price increases allowed in our contractual relationships, or through cost reduction efforts. If we are unable to fully offset the increased cost of raw materials through price increases, it could significantly impact our business, financial condition and results of operations.

We may experience a shortage of reliable and adequate transport capacity and any material increase in transportation costs could have a material adverse effect on our results of operations.

We currently plan to transport Arq's our Arq Powder based filter cake from produced at the Corbin Facility ("Wet Cake") to the Red River Plant by rail and truck. We may experience roadway or railway transportation disruptions that could have a material adverse effect on our operations or financial condition. There can be no assurance that we will be able to secure sufficient truck or railway transport capacity to transport raw materials from the Corbin Facility to the Red River Plant. Further, in the event of railway transport shortages, there can be no assurance that road transportation will be able to satisfy the shortfall. Raw Potential transportation classifications of raw materials may also be combustible or ignitable require permitting, and appropriate special care and permitting may be required in handling and transporting to transport such materials. In addition, any material increase in transportation costs could have a negative effect on the competitiveness of our future products, which may in turn have a material adverse effect on our business and results of operations.

We face operational risks inherent in mining operations, and our mining operations have the potential to cause safety issues, including those that could result in significant personal injury.

We own the Five Forks Mine, a lignite coal mine located in Louisiana, which is operated for us by a third party. Mining operations by their nature involve a high level of uncertainty and are often affected by risks and hazards outside of our control. At the Five Forks Mine, the risks are primarily operational risks associated with the maintenance and operation of the heavy equipment required to dig and haul the lignite and risks relating to producing lower than expected lignite quality or recovery rates. Additionally, the cost of inputs in our mining operation, most notably fuel cost, can create operational risks. The failure to adequately manage these risks could result in significant personal injury, loss of life, damage to mineral properties, production facilities or mining equipment, damage to the environment, delays in or reduced production and potential legal liabilities.

We also own the Marshall Mine, a former lignite coal mine located in Texas, which ceased mining operations in the third quarter of 2020 and is currently being reclaimed. Reclamation operations by their nature involve a high level of uncertainty and are often affected by risks and hazards outside of our control. In light of where we are in the reclamation process at the Marshall Mine, the current risks associated with the Marshall Mine are primarily those associated with our inability to fulfill our obligations in the reclamation process. The failure to adequately manage these risks could result in damage to the environment, delays in reclamation and potential legal liabilities.

Our operations and products are subject to extensive safety, health and environmental requirements that could increase our costs and/or impair our ability to manufacture and sell certain products.

Our ongoing operations are subject to extensive federal, state and local laws, regulations, rules and ordinances relating to safety, health and environmental matters, many of which provide for substantial monetary fines and potential criminal sanctions for violations. These include requirements to obtain and comply with various environmental-related permits for constructing any new facilities (or modifications to existing facilities) and operating all of our existing facilities. **In addition, the Red River Plant may become subject to greenhouse gas emission trading requirements under which we may be required to purchase emission credits if our emission levels exceed our allocations. Greenhouse gas regulatory programs that have been adopted, such as cap-and-trade programs, have not had a significant impact on our business to date. However, costs** Costs of complying with regulations could increase, as concerns related to greenhouse gases and climate change continue to emerge.

The enactment of new environmental laws and regulations and/or the more aggressive interpretation of existing requirements could require us to incur significant costs for compliance or capital improvements or limit our current or planned operations, any of which could have a material adverse effect on our earnings or cash flow. We may attempt to offset the effects of these compliance costs through price increases, productivity improvements and cost reduction efforts. Our success in offsetting any such increased regulatory costs is largely influenced by competitive and economic conditions and could vary significantly depending on the market segment served. Such increases may not be accepted by our customers, may not be sufficient to compensate for increased regulatory costs or may decrease demand for our products and our volume of sales.

We may not be successful in achieving our growth expectations related to new products in our existing or new markets.

We may not be successful in achieving our growth expectations from developing new products for our existing or new markets. Further, there can be no assurance that costs incurred to develop new products will result in an increase in revenues. Additionally, our Our ability to bring new products to the market will depend on various factors, including, but not limited to, solving potential technical or manufacturing difficulties, competition and market acceptance, which may hinder the timeliness and cost to bring such products to production. **Further, there can be no assurance that costs incurred to develop new products will result in an increase in revenue.** These factors or delays could affect our future operating results.

Natural disasters or extreme weather could affect our operations and financial results.

We operate facilities, including the Red River Plant, Five Forks Mine and the Corbin Facility, that are exposed to natural hazards, such as floods, windstorms and hurricanes. Extreme weather events present physical risks that may become more frequent as a result of factors related to climate change. Such events could disrupt our supply of raw materials or otherwise affect production, transportation and delivery of our products or affect demand for our products.

In addition, extreme and unusually cold or hot temperatures throughout the U.S. could result in abnormally high loads on geographic electrical grids that could result in the failure of coal-fired power plants to produce electricity. If these plants were off-line for a significant period of time, the demand for our products could be less, which would impact our operations and financial results. Conversely, abnormally high loads on geographic electrical grids, resulting in increased demand of coal-fired power plants to produce electricity, could impact our ability to meet customer contracts and demands.

Failure to effectively monitor and respond to environmental, social or governance ("ESG") matters, including our ability to set and meet reasonable goals related to climate change and sustainability efforts, may negatively affect our business and operations.

Regulatory developments and stakeholder expectations relating to ESG matters are rapidly changing. **Concern over climate change has increased focus on the sustainability of practices and products in the markets we serve, and changes to laws and regulations regarding climate change mitigation may result in increased costs and disruption to operations. Moreover, the standards by which ESG matters are measured are developing and evolving, and certain areas are subject to assumptions that could change over time. If we are unable to recognize and respond to such developments, or if our existing practices and procedures are not adequate to meet new regulatory requirements, we may miss corporate opportunities, become subject to regulatory scrutiny or third-party claims, or incur costs to revise operations to meet new standards.**

In 2024, we plan to publish our first corporate responsibility and sustainability tear sheet to address the impact of our operations on climate change and discuss material social, governance and environmental issues and our goals related to the same. Any failure or perceived failure to achieve our sustainability goals or to act responsibly with respect to such matters may negatively impact our operations and/or financial condition. While we monitor a broad range of ESG issues, there can be no assurance that we will manage such issues successfully, or that we will successfully meet the expectations of our stakeholders, consumers and employees.

Information technology vulnerabilities and cyberattacks on our networks could have a material adverse impact on our business.

We rely on information technology ("IT") to manage and conduct business, both internally and externally, with our customers, suppliers and other third parties. Internet transactions involve the transmission and storage of data including customer and supplier business information. Therefore, maintaining the security of computers and other electronic devices, computer networks and data storage resources is a critical issue for us and our customers and suppliers because security breaches could result in reduced or lost ability to carry on our business and loss of, and/or unauthorized access to, confidential information.

We have limited personnel and other resources to address information technology reliability and security of our computer networks, and to respond to known security incidents to minimize potential adverse impact. Experienced hackers, cybercriminals and perpetrators of threats may be able to penetrate our network security and misappropriate or compromise our confidential information or that of third parties, create system disruptions or cause shutdowns. These perpetrators of cyberattacks also may be able to develop and deploy viruses, worms, malware and other malicious software programs that attack our information and networks or otherwise exploit any security vulnerabilities of our information and networks.

Techniques used to obtain unauthorized access to or sabotage systems change frequently and often are not recognized until after they are launched against a target, and we may be unable to anticipate these techniques or to implement adequate preventative measures. A breach of our IT systems and security measures **or those of our third party partners** as a result of third party action, malware, employee error, malfeasance or otherwise could materially adversely impact our business and results of operations and expose us to customer, supplier and other third party liabilities.

Risks Related to Intellectual Property

Failure to protect our intellectual property or infringement of our intellectual property by a third party could have an adverse impact on our financial condition.

We rely on a combination of patent, copyright and trademark laws, trade secrets, confidentiality procedures and contractual provisions to protect our proprietary rights. Such means of protecting our proprietary rights may not be adequate because they provide only limited protection or such protection may be prohibitively expensive to enforce. We also enter into confidentiality and non-disclosure agreements with our employees, consultants and many of our customers and vendors, and generally control access to and distribution of our proprietary information. Notwithstanding these measures, a third party could copy or otherwise obtain and use our proprietary information without authorization. We cannot provide assurance that the steps we have taken will prevent misappropriation of our technology and intellectual property, which could negatively impact our business and financial condition. In addition, such actions taken by third parties could divert the attention of our management from the operation of our business.

We may be subject to intellectual property infringement claims from third parties that are costly to defend and that may limit our ability to use the disputed technologies.

If our technologies are alleged to infringe the intellectual property rights of others, we may be forced to mount a defense to such claims, which may be expensive and time consuming. During the pendency of litigation, we could be prevented from marketing and selling existing products or services and from pursuing research, development or commercialization of new or complimentary products or services. Further, we may be required to obtain licenses to third party intellectual property or be forced to develop or obtain alternative technologies. Our failure to obtain a license to a technology that we may require, or the need to develop or obtain alternative technologies, could significantly and negatively affect our business.

Indemnification of third-party licensees of our technologies against intellectual property infringement claims concerning our licensed technology and our products could be financially significant to us.

We have agreed to indemnify licensees of our technologies (including TINUUM Group) and purchasers of our products, and we may enter into additional agreements with others under which we agree to indemnify and hold them harmless from losses they may incur as a result of the alleged infringement of third-party rights caused by the use of our technologies and products. Infringement claims, which may be expensive and time-consuming to defend, could have a material adverse effect on our business, operating results and financial condition, even if we are successful in defending ourselves (and the indemnified parties) against them.

Our future success depends in part on our ongoing identification and development of intellectual property and our ability to invest in and deploy new products, services and technologies into the marketplace efficiently and cost effectively.

The process of identifying customer needs and developing and enhancing products, services and solutions for our **customer customer** markets is complex, costly and uncertain. Any failure by us to identify and anticipate changing needs, emerging trends and new regulations could significantly harm our future market share and results of operations.

Risk related to tax matters

An "ownership change" is more likely as a result of the Arq Acquisition and PIPE Investment and could limit our Our ability to utilize our tax credit carryforwards assets to offset future tax liability.

We have certain general business credits carryforwards ("Tax Credits"). As of December 31, 2022, we had \$86.1 million of Tax Credits, equaling 87% of our total gross deferred tax assets. Our ability to use these Tax Credits to offset future federal income tax liability may could be significantly limited if we experience from an "ownership change" as discussed below. Under change."

In general, under IRC Sections 382 and 383 of the Internal Revenue Code of 1986, as amended, ("IRC") a corporation that undergoes an "ownership change" is subject to limitations on its ability to utilize its pre-change net operating losses ("NOLs") and tax credits to offset future taxable income. In general, an ownership change occurs if the aggregate stock ownership of certain stockholders (generally 5% stockholders (as defined in IRC Section 382), applying certain look-through rules) increases by more than 50 percentage points during the testing period (generally a three-year lookback period). An entity that experiences an ownership change generally is subject to an annual limitation on its pre-ownership change tax asset carryforwards. The annual limitation is increased each year to the extent that there is an unused limitation in a prior year.

We acquired certain tax assets (the "Legacy Arq Tax Assets") in the Arq Acquisition, totaling approximately \$12.5 million. The Legacy Arq Tax Assets are comprised of NOL carryforwards, of which \$8.8 million were incurred in the U.S. Further, as of December 31, 2023, we had approximately \$86.1 million of general business credit carryforwards (the "Tax Credits"), totaling approximately 77% of consolidated tax assets. Under the IRC and regulations promulgated by the U.S. Treasury Department and the IRS, we may carry forward or otherwise utilize the our NOLs and Tax Credits (collectively, "Tax Assets") in certain circumstances to offset current and future federal income tax liabilities, subject to certain requirements and restrictions. However, our ability to use our Tax Assets to offset future federal income tax liability is limited if Legacy Arq or Arq, or both, experience an "ownership change" as discussed above. To the extent that the Tax Credits Assets do not otherwise become limited, we believe that we will have available a significant amount of Tax Credits Assets in future years, and therefore the Tax Credits Assets could be a substantial asset to us. However, if

In connection with the Arq Acquisition and PIPE Investment, we experience issued additional shares of our common stock. We performed an "ownership change," IRC Section 382 analysis as defined in IRC Sections 382 and 383, our ability to use the Tax Credits may be substantially limited, and the timing of the usage of the Tax Credits could be substantially delayed, which could significantly impair the value of Acquisition Date and determined that asset.

In general, we had not experienced an "ownership change" under IRC Sections 382 and 383 occurs if the percentage as of stock owned by an entity's 5% stockholders (as defined in IRC Section 382) increases by more than 50 percentage points over a rolling three-year period. An entity that experiences an ownership change generally will be subject to an annual limitation on its pre-ownership change tax credit carryforwards equal to the tax liability which is attributable to the amount of the entity's taxable income that does not exceed the equity value of the entity immediately before the ownership change, multiplied by the long-term, tax-exempt rate posted monthly by the IRS (subject to certain adjustments). The annual limitation would be increased each year to the extent that there is an unused limitation in a prior year. The limitation on our ability to utilize the Tax Credits arising from an ownership change under IRC Sections 382 and 383 would depend on the value of our equity at the time of any ownership change. date. If we were to experience an "ownership change," it is possible that a significant portion of our Tax Credits Assets could expire before we would be able to use them to offset future federal income tax liability.

In connection with Prior to the Acquisition Date, Legacy Arq Acquisition and PIPE Investment, we issued additional shares of our stock, completed numerous equity offerings that resulted in ownership changes. We performed an have not completed a formal IRC Section 382 analysis related to of Legacy Arq equity changes from its inception through the Arq Acquisition and PIPE Investment and determined Date, however, we had not experienced an ownership change believe that one or more "ownership changes" occurred during this time period as of the date of the Arq Acquisition and PIPE Investment. However, the emergence of a single new 5% stockholder (as defined for purposes of IRC Section 382) or other changes, could result in our undergoing an "ownership change" and therefore there is a risk that we could experience an "ownership change" for purposes of IRC under Sections 382 and 383. 383 and that a portion or all the Legacy Arq Tax Assets may subject to an annual limitation.

On To mitigate the risk of an "ownership change," on May 5, 2017, our board of directors (the "Board") approved the Tax Asset Protection Plan (the "TAPP") and declared a dividend of one preferred share purchase right (each, a "Right") for each outstanding share of our common stock. The TAPP was adopted in an effort to protect stockholder value by attempting to diminish the risk that our ability to use the ADES Tax Credits to reduce potential future federal income tax obligations may become substantially limited (the "Protection Plan"). During the years 2018-2022, 2018-2023, we executed amendments to the TAPP (the "TAPP Amendments"), which amended the definition of "Final Expiration Date Date" under the TAPP to extend the duration of the TAPP and makes associated changes in connection therewith. The most recent TAPP Amendment was approved at our 2022 2023 annual meeting of stockholders and extended the Final Expiration Date to the close of business on December 31, 2023 December 31, 2024.

The TAPP, as amended, is intended to act as a deterrent to any person acquiring beneficial ownership of 4.99% or more of our outstanding common stock without the approval of the Board. Stockholders who beneficially owned 4.99% or more of our outstanding common stock upon execution of the Protection Plan will not trigger the Protection Plan so long

as they do not acquire beneficial ownership of additional shares of our common stock. The Board may, in its sole discretion, also exempt any person from triggering the Protection Plan.

In connection with the Arq Acquisition and PIPE Investment, we granted a waiver under the TAPP for certain shareholders to acquire more shares of our stock in the future, provided that such acquisition is not expected to, and does not, effect an "ownership change" under IRC Sections 382 and 383. Despite the TAPP, our projections of what will effect an ownership change could be wrong, and with a waiver in place for certain shareholders, there is a risk that we experience an ownership change for purposes of IRC Sections 382 and 383 because of future acquisitions of our common stock.

Risks Related to Our Common Stock

Our stock price is subject to volatility.

The market price of our common stock has experienced substantial price volatility in the past and may continue to do so. The market price of our common stock may continue to be affected by numerous factors, including:

- a. market perception of the Arq Acquisition;
- b. actual or anticipated fluctuations in our operating results and financial condition;
- c. changes in laws or regulations and court rulings and trends in our industry;
- d. announcements of sales awards;
- e. changes in supply and demand of components and materials;
- f. adoption of new tax regulations or accounting standards affecting our industry;
- g. changes in financial estimates by securities analysts;
- h. trends in social responsibility and investment guidelines;
- i. whether we are able and elect to pay cash dividends;
- j. the continuation of repurchasing shares of common stock under stock repurchase programs; and
- k. the degree of trading liquidity in our common stock and general market conditions.

From January 1, 2021, January 1, 2023 to December 31, 2022, December 31, 2023, the closing price of our common stock ranged from \$2.19 to \$1.25 to \$8.15 to \$3.66 per share. Stock price volatility over a given period may cause the average price at which we repurchase shares of our common stock to exceed the stock's price at a given point in time. We believe our stock price should reflect expectations of future growth and profitability. Future dividends are subject to declaration by the Board, and under our current stock repurchase program, we are not obligated to acquire any specific number of shares. If we fail to meet expectations related to future growth, profitability, dividends, stock repurchases or other market expectations, our stock price may decline significantly, which could have a material adverse impact on our ability to obtain additional capital and erode investor confidence, which could further reduce the liquidity of our common stock. We do not expect to repurchase additional shares of our common stock in the near term.

We are unlikely to resume our quarterly cash dividend program.

The Board first approved a \$0.25 per share of common stock quarterly dividend in June 2017. We last paid a cash dividend on March 10, 2020.

Under the Loan Agreement with CF Global, we are generally prohibited from paying dividends on our common stock as long as the Term Loan remains outstanding. Even if the Term Loan with CF Global is repaid, it is unlikely for the foreseeable future that we will resume declaring quarterly cash dividends under a dividend program. The payment of future dividends will be affected by, among other factors: (1) our views on potential future capital requirements for investments in acquisitions; (2) legal risks; (3) stock repurchase programs; (4) changes in federal and state income tax laws or corporate laws; (5) changes to our business model; and (6) restrictions on dividends set forth in the agreements governing our existing indebtedness (including the Loan Agreement with CF Global) and any additional indebtedness that we may incur in the future.

Our certificate of incorporation and bylaws contain provisions that may delay or prevent an otherwise beneficial takeover attempt of us.

Certain provisions of our certificate of incorporation and bylaws could make it more difficult for a third party to acquire us, even if doing so would be beneficial to our stockholders. These include provisions that:

- a. Limit the business at special meetings of stockholders to the purpose stated in a notice of the meeting;
- b. Authorize the issuance of "blank check" preferred stock, which is preferred stock with voting or other rights or preferences that could impede a takeover attempt and that the Board can create and issue without prior stockholder approval;
- c. Establish advance notice requirements for submitting nominations for election to the Board and for proposing matters that can be acted upon by stockholders at a meeting; and
- d. Require the affirmative vote of the "disinterested" holders of a majority of our common stock to approve certain business combinations involving an "interested stockholder" or its affiliates, unless either minimum price criteria or procedural requirements are met, or the transaction is approved by a majority of our "continuing directors" (known as "fair price provisions").

These provisions, alone or in combination with each other, may discourage transactions involving actual or potential changes of control, including transactions that otherwise could involve payment of a premium over prevailing market prices to holders of our common stock, or could limit the ability of our stockholders to approve transactions that they may deem to be in their best interest.

An increased focus on environmental, social and governance factors by institutional investors may negatively impact our access to capital and the liquidity of our stock price.

Some institutional investors have recently adopted **Environmental, Social and Governance ("ESG")** ESG investing guidelines that may prevent them from increasing or taking new stakes with companies with exposure to fossil fuels. Additional institutional investors may adopt similar ESG investment guidelines. This could limit both the demand for owning our common stock and/or our access to capital. If such capital is desired, we cannot assure you that we will be able to obtain any additional equity or debt financing on terms that are acceptable to us. Given these emerging trends, liquidity in our common stock and our stock price may be negatively impacted.

We may require additional funding for our growth plans, and such funding may require us to issue additional shares of our common stock resulting in a dilution of your investment.

We estimate our funding requirements in order to implement our growth plans. If the actual funding required to implement growth initiatives should exceed funding estimates significantly, or our funds generated from our operations from such growth initiatives prove insufficient for such purposes, we may need to raise additional funds to meet these funding requirements.

These additional funds may be raised by issuing equity or debt securities or by borrowing from banks or other resources. We cannot assure you that we will be able to obtain any additional financing on terms that are acceptable to us, or at all. If we fail to obtain additional financing on terms that are acceptable to us, we may not be able to implement such plans fully. Such financing, even if obtained, may be accompanied by conditions that limit our ability to pay dividends or require us to seek lenders' consent for payment of dividends, or restrict our ability to operate our business by requiring lender's consent for certain corporate actions. Further, if we raise additional funds through the issuance of new shares of our common stock, any shareholders who are unable or unwilling to participate in such an additional round of fund raising may suffer dilution of their investment.

Certain legacy Legacy Arq shareholders and participants in the PIPE Investment hold a significant portion of the voting power of ADES our common stock.

Certain legacy Legacy Arq shareholders and participants in the PIPE Investment hold a significant percentage of our outstanding common shares. Accordingly, stock, and such persons, acting individually or together, could have the ability to exert a substantial influence on actions requiring a stockholder vote. For example, Jeremy Blank, a former director of Arq Ltd. and who is currently one of our directors through his affiliates, hold approximately 2.36% of the outstanding shares of our common stock, and Julian McIntyre, who is Arq's former chief executive officer and director of Arq and who is currently one of our directors, holds approximately 4.49% of the outstanding shares of ADES common stock. The influence of these significant stockholders may be used in a manner that other stockholders may not support. Any such concentration of ownership may have the effect of delaying certain corporate actions, and may consequently impact the ability of other stockholders to influence the management and policies of ADES.

The conversion of the outstanding shares of our Series A Preferred Stock would dilute the ownership of holders of our Common Stock and may adversely affect the market price of our Common Stock.

Each share of our Series A Preferred Stock will be automatically converted into shares of Common Stock at the conversion ratio described herein upon the approval by the holders of the percentage of Common Stock required to approve such conversion under the applicable rules of Nasdaq. As of February 24, 2023, 5,294,462 shares of our Series A Preferred Stock were outstanding, representing approximately 16% of our outstanding common stock on an as-converted basis. In addition, prior to the conversion of the Series A Preferred Stock into Common Stock, each share of Series A Preferred Stock will accrue dividends on a quarterly basis at an annual rate of 8% on the \$4.00 Original Issuance Amount per share of Series A Preferred Stock. We will have the ability to pay any such dividends in kind by issuing additional shares of Series A Preferred Stock, which would increase the number of shares of Series A Preferred Stock outstanding and, consequently, the number of shares of our Common Stock that would be issuable upon the conversion of the Series A Preferred Stock.

The conversion of the Series A Preferred Stock to Common Stock would dilute the ownership interest of existing holders of our Common Stock, and any sales in the public market of the Common Stock issuable upon conversion of the Series A Preferred Stock would increase the number of shares of our Common Stock available for public trading, and could adversely affect prevailing market prices of our Common Stock. Company.

Item 1B. Unresolved Staff Comments

None.

Item 1C. Cybersecurity

Definitions

- **Cybersecurity incident** means an unauthorized occurrence, or a series of related unauthorized occurrences, on or conducted through a registrant's information systems that jeopardizes the confidentiality, integrity, or availability of a registrant's information systems or any information residing therein.
- **Cybersecurity threat** means any potential unauthorized occurrence on or conducted through a registrant's information systems that may result in adverse effects on the confidentiality, integrity, or availability of a registrant's information systems or any information residing therein.
- **Information systems** means electronic information resources, owned, or used by the registrant, including physical or virtual infrastructure controlled by such information resources, or components thereof, organized for the collection, processing, maintenance, use, sharing, dissemination, or disposition of the registrant's information to maintain or support the registrant's operations.

Risk Management and Strategy

We have established policies and processes for assessing, identifying, and managing material risk from cybersecurity threats, and have integrated these processes into our overall risk management processes. We routinely assess material risks from cybersecurity threats, including any potential unauthorized occurrence on or conducted through our information systems that may result in adverse effects on the confidentiality, integrity, or availability of our information systems or any information residing therein.

We engage third parties in connection with our risk assessment processes. We require each third-party service provider to adhere to our internal security policies and certify that it has the ability to implement and maintain appropriate security measures, consistent with all applicable laws, to implement and maintain reasonable security measures in connection with their work with us, and to promptly report any suspected breach of its security measures that may affect our company. These service providers are primarily overseen by our Vice President of Information Technology ("VP of IT") and assist us in monitoring and testing our safeguards, including execution of external penetration testing and ongoing real time vulnerability assessments through our extended detection and response processes to identify cybersecurity threats. We conduct risk assessments in the event of a material change in our business processes that may affect information systems that are vulnerable to such cybersecurity threats through our normal change control processes. These risk assessments include identification of reasonably foreseeable internal and external risks, the likelihood and potential damage that could result from such risks, and the sufficiency of existing policies, procedures, systems, and safeguards in place to manage such risks.

Following these risk assessments, we re-design, implement, and maintain reasonable safeguards to minimize identified risks; reasonably address any identified gaps in existing safeguards; and regularly monitor the effectiveness of our safeguards. We devote resources and personnel, including our VP of IT, who reports to our VP of Finance, to manage the risk assessment and mitigation process.

As part of our overall risk management, we monitor and test our safeguards and train our employees on the importance of these safeguards. We maintain a formal information security awareness training program for all employees that includes training on matters such as phishing, email security best practices and data protection. Employees also receive random phishing tests at regular intervals to further assess and mitigate overall risk.

We maintain a cybersecurity incident response plan to help ensure a timely, consistent and compliant response to actual or attempted cybersecurity incidents impacting the Company. The Response Plan includes (1) detection, (2) analysis, which may include timely notice to our management and audit committee chair, (3) containment, (4) eradication, (5) recovery and (6) post-incident review. We also maintain cybersecurity insurance to manage potential liabilities resulting from specific cybersecurity incidents. It is important to note that although we maintain cybersecurity insurance, there can be no guarantee that our insurance coverage limits will protect us against any future claims or that such insurance proceeds will be paid to us in a timely manner.

To date there have been no cybersecurity incidents that have materially affected the Company or its operations. Despite security measures we have implemented, there is always the risk that certain cybersecurity incidents could materially disrupt operational systems limiting our ability to manufacture and deliver products to customers.

Governance

Our VP of IT has approximately five years of experience in cybersecurity and oversees our cybersecurity policies and processes, including those described in "Risk Management and Strategy" above. Our VP of IT is primarily responsible for assessing and managing our material risks from cybersecurity threats, including monitoring and assessing strategic risk exposure.

While management is responsible for the day-to-day management of cybersecurity policies and procedures, our audit committee is tasked with oversight of our risk management process, which includes risks from cybersecurity threats. The processes by which our audit committee is informed about and monitors the Company's strategy regarding the prevention, detection, mitigation, and remediation of cybersecurity incidents includes the following:

Our VP of IT provides quarterly briefings to the audit committee regarding our company's cybersecurity risks and activities, including any recent cybersecurity incidents and related responses, emerging threats and updates, cybersecurity systems testing, activities of third parties, and the like. Our audit committee and VP of IT provide regular updates to the board of directors on such reports. In the event of an actual cybersecurity threat or incident, management is notified in accordance with the cybersecurity response plan above.

Item 2. Properties

Office and Facilities

We own or lease land and facilities in the following States:

Colorado - We lease approximately 24,000 square feet of office space in Greenwood Village, Colorado for our corporate headquarters and primary research and development laboratory.

Louisiana - We own the Red River Plant, which is located on approximately 61 acres and leased approximately 22,000 square feet of warehouse space in Coushatta, Louisiana, acres. We also lease approximately 60,000 square feet of warehouse space in Natchitoches Parish, Louisiana, where we operate a production and distribution facility. Further, we lease approximately 59,000 square feet of warehouse space and seven acres of land in Campti, Louisiana for storage of our products.

On February 1, 2023, following completion of the Arq Acquisition, we lease approximately 7,100 square feet of office space in Lexington, Kentucky and approximately 1,180 141,000 square feet in London, UK. Additionally, we also various locations that is used for production, distribution and storage.

Kentucky - We lease approximately 470 acres in Corbin, Kentucky where we operate the Corbin Facility.

Mining

As of December 31, 2022 December 31, 2023, we owned or controlled, primarily through long-term leases, approximately 4,425 1,975 acres of coal land for surface mining. Of those acres, approximately 1,975 acres are mining located in Natchitoches Parish, Louisiana ("Five Forks"). The majority of the Five Forks land is leased for mineral rights and right-of-use purposes that expire at varying dates over the next 30 years and contain options to renew. The remaining land is owned by us.

Under our current mining plans, substantially all leased reserves will be mined out within the period We also have approximately 380 acres of existing leases or within the time period of assured lease renewals. Royalties are paid to lessors either as a fixed price per ton or as a percentage of the gross sales price of the mined coal. The majority of the significant leases are on a percentage royalty basis. In some cases, a payment is required either land containing bituminous coal waste at the time Corbin Facility for recovery of execution of the lease or in annual installments. In most cases, the prepaid royalty amount is applied to reduce future production royalties.

The remaining 2,450 acres (of 4,425 acres of bituminous coal land for surface mining) pertain to the Marshall Mine, fines, which is located in Harrison leased through August 31, 2025 and Panola Counties, Texas. Mining operations contains options to renew for successive five year terms until all merchantable fines are removed from the premises. Based on current operating assumptions, we intend to renew this land ceased in the third quarter of 2020. lease for an additional five-year term. Based on the materiality and the vertically-integrated company guidelines contained in Regulation S-K of the Securities Act and the Exchange Act, we have concluded that no additional disclosures related to our mining operations are required under this Item.

Item 3. Legal Proceedings

From time to time, we are involved in various litigation matters arising in the ordinary course of our business. Information with respect to this item may be found in Note 7 8 "Commitments and Contingencies" to the Consolidated Financial Statements included in Item 8 of this Report.

Item 4. Mine Safety Disclosures

The statement concerning mine safety violations or other regulatory matters required by Section 1503(a) of the Dodd-Frank Wall Street Reform and Consumer Protection Act and Item 104 of Regulation S-K is included in Exhibit 95 to this Report.

PART II

Item 5. Market for Registrant’s Common Equity, Related Stockholder Matters and Issuer Purchases of Equity Securities

Market for Our Common Stock

As of December 31, 2022 Effective February 1, 2024, our common stock is quoted on the Nasdaq Global Market under the symbol "ARQ." Prior to that, our common stock was quoted on the Nasdaq Global Market under the symbol "ADES." The trading volume for our common stock is relatively limited. There is no assurance that an active trading market will provide adequate liquidity for our existing stockholders or for persons who may acquire our common stock in the future.

Dividends

In June 2017, we commenced a quarterly cash dividend program of \$0.25 per common share and made our most recent dividend payment was in March 2020. Under We do not intend to declare or pay cash dividends in the Loan Agreement with CF Global, we are generally prohibited from paying dividends on foreseeable future.

Holders

The Company had 875 holders of record of our common stock as long as the Term Loan remains outstanding. Even if the Term Loan with CF Global is repaid, it is unlikely for the foreseeable future that we will resume declaring quarterly cash dividends under a dividend program.

Holders

of March 5, 2024. The number of holders of record of our common stock is based upon the actual number of holders registered on the books of the Company as of February 24, 2023 such date and does not include holders of shares that are held in street name by brokers or other nominees.

Recent Sales of Unregistered Securities and Use of Proceeds from Registered Securities

On February 1, 2023, we entered into subscription agreements with certain persons (the "Subscribers"), which included existing shareholders of Arq Ltd., three of which were appointed to our Board of Directors, pursuant to which the Subscribers subscribed for and purchased 3,842,315 shares of our Common Stock for an aggregate purchase price of \$15.4 million and at a price per share of \$4.00 (such transaction, the "PIPE Investment").

On July 17, 2023, we entered into a subscription agreement (the "Subscription Agreement") with Mr. Robert "Bob" Rasmus and entities controlled by Mr. Rasmus, in connection with his appointment as our President and Chief Executive Officer. Pursuant to the Subscription Agreement, Mr. Rasmus subscribed for and agreed to purchase 950,000 shares of our common stock, par value \$0.001 per share, from the Company for an aggregate purchase price of \$1.8 million (at a price per share of approximately \$1.90).

The securities issued to the Subscribers and Mr. Rasmus under the PIPE Investment and the Subscription Agreement, respectively, were issued pursuant to an exemption from registration under Section 4(a)(2) of the Securities Act, Rule 506 of Regulation D, which is promulgated thereunder, and Regulations S of the Securities Act. We are relying on this exemption from registration based in part on representations made by each of the Subscribers and Mr. Rasmus under their respective subscription agreements. The sale of the securities pursuant to the PIPE Investment has been subsequently registered under the Securities Act on Registration No. 333-276375, which was approximately 900. declared effective on January 31, 2024. The approximate number sale of beneficial stockholders is estimated at 8,300, the securities pursuant to the Subscription Agreement (the "Subscriber Shares") has not been registered under the Securities Act or any state securities laws. The Subscriber Shares may not be offered or sold in the United States absent registration or an applicable exemption from registration requirements.

Purchases of Equity Securities by the Company Issuer and Affiliated Purchasers

We had no repurchases of our common stock for the three months ended December 31, 2022, Share Repurchases

We maintain a program to repurchase up to \$20.0 million of shares of our common stock under a stock repurchase program (the "Stock Repurchase Program") through open market transactions at prevailing market prices. The Board subsequently approved an amendment to The Stock Repurchase Program in prices, of which it authorized an incremental \$7.1 million, resulting in a total of \$10.0 million of shares of our common stock allowable to repurchase. As of December 31, 2022, \$7.0 million of shares of our common stock remained outstanding for repurchase under available at December 31, 2023. No purchases were made during the Stock Repurchase Program, which will remain in effect until all amounts are utilized or it is otherwise modified by the Board, three months ended December 31, 2023. It is unlikely for the foreseeable future that we will resume repurchasing shares of our common stock under the repurchase program, Stock Repurchase Program.

Tax Withholding

The following table contains information about common shares that we withheld from delivering to employees during the fourth quarter of 2023 to satisfy their respective tax obligations related to stock-based awards.

Period	Total Number of Common Shares Purchased	Average Price Paid per Common Share	Total Number of Common Shares Purchased as Part of Publicly Announced Plans or Programs	Maximum Number (or Dollar Value) of Common Shares that May Yet Be Purchased Under the Plans or Programs
October 1, 2023 to October 31, 2023	—	—	N/A	N/A
November 1, 2023 to November 30, 2023	—	\$ —	N/A	N/A
December 1, 2023 to December 31, 2023	7,969	\$ 2.71	N/A	N/A

Item 6. Reserved

Item 7. Management’s Discussion and Analysis of Financial Condition and Results of Operations

Overview

We sell are an environmental technology company and are principally engaged in the sale of consumable air and water treatment solutions primarily based on AC. Our proprietary AC products that utilize enable customers to reduce air, soil, and water contaminants, including mercury, PFAS and other pollutants, to help our customers maximize utilization effectiveness and to improve operating efficiencies to meet the challenges of existing and pending air quality, soil, and water regulations. We manufacture and sell AC and chemical-based technologies other chemicals used to a broad range of customers, including capture and remove contaminants for coal-fired utilities, industrials, power generation, industrial and water treatment plants, and other diverse markets, through a customer supply agreement described below, which we collectively refer to as the advanced purification technologies or "APT" market.

Our primary products are comprised of AC, which is produced from a variety of carbonaceous raw materials. Our AC products include both PAC and GAC. Our proprietary technologies and associated product offerings provide purification solutions to enable our customers to reduce certain contaminants and pollutants to meet the challenges of existing and potential future regulations. Additionally, we own the Five Forks Mine, a lignite mine that currently supplies the primary raw material for the manufacturing of our products.

Through December 31, 2021, in February 2023, we acquired 100% of the equity of the subsidiaries of Arq Limited (hereafter the Arq Limited subsidiaries referred to as "Legacy Arq", and the acquisition itself referred to as the "Arq Acquisition") to secure access to a feedstock, a manufacturing facility and certain patented processes as a means to manufacture additional GAC products for sale into the APT and other markets. With the Arq Acquisition, we operated two segments: Refined Coal ("RC") now control bituminous coal waste reserves and Advanced Purification Technologies ("APT"). Our RC segment was comprised of our equity ownership own a manufacturing facility, both located in Tinnuum Group Corbin, Kentucky (the "Corbin Facility"), and Tinnuum Services, both of which are unconsolidated entities from which a process to recover and purify the bituminous coal fines for sale or further conversion to GAC products. Under this manufacturing process, we generated substantial earnings through December 31, 2021 convert coal waste into a purified, microfine carbon powder known as Arq powder™ ("Arq Powder"). We also earned royalties for technologies that we licensed expect to Tinnuum Group, which were used at certain RC facilities to enhance combustion and reduce emissions of NOx and mercury from coal burned to generate electrical power. Effective December 31, 2021, the Section 45 tax credit period expired and, begin using Arq Powder as a result, both Tinnuum Group feedstock to begin manufacturing GAC products by the end of 2024 to begin using Arq Powder as a feedstock to produce high-quality GAC products for sale in the APT and Tinnuum Services ceased their operations. During 2022, we received other markets.

We believe Arq Powder has additional cash distributions from both Tinnuum Group potential for us to access new markets and Tinnuum Services applications. We expect to secure customer interest in Arq Powder as they wound down their operations. We may receive additional cash distributions until both entities an additive into other markets, such as components for asphalt. These products utilizing Arq Powder are dissolved, expected to have a lower carbon footprint compared to similar products utilizing conventional materials. These applications are currently in various stages of proof of concept testing or preliminary customer testing.

Given In February 2024, as part of a larger rebranding, the wind-down of Tinnuum Group Company changed its name to Arq, Inc., and Tinnuum Services and on February 1, 2024, our common stock commenced trading under the impact on our financial statements, we determined the historical RC segment no longer met the qualitative or quantitative criteria to be considered a reporting segment under U.S. GAAP. As a result, as well as the method in which the chief operating decision maker allocates resources, beginning January 1, 2022, we determined that we had one reportable segment, and therefore have removed segment disclosures for this Report. ticker symbol, "ARQ".

Drivers of Demand and Key Factors Affecting Profitability

Drivers of demand and current key factors affecting our profitability are sales of our consumables-based solutions for coal-fired power generation, industrials, municipal water customers and other diverse markets served by our major customer, Norit, AC products to whom we sell product through the Supply Agreement discussed below. APT market. Our operating results are influenced by: (1) changes in our manufacturing production and sales volumes; (2) changes in price and product mix; (3) changes in coal-fired dispatch and electricity power generation sources and (4) changes in demand for contaminant removal within water treatment facilities. During 2022, we continued to see high demand for our AC products. As such, we continued to purchase inventory to supplement customer demands in excess of our production capacity and to achieve our target inventory levels. Although we expect to continue to supplement inventories throughout 2023, we anticipate that those purchases will be at reduced levels compared to 2022.

Supply Agreement

On September 30, 2020, we and Norit entered into the Supply Agreement, pursuant to which we agreed to sell and deliver to Norit, and Norit agreed to purchase and accept from us, our products. The term of the Supply Agreement is for 15 years with 10-year renewal terms that are automatic unless either party provides three years prior notice of intention not to renew before the end of any term.

For 2022 and 2021, the Supply Agreement provided material incremental volume and allowed us to capture operating cost efficiencies at the Red River Plant. The incremental volumes from the Supply Agreement have improved fixed cost absorption and resulted in increased gross margins. Further, the Supply Agreement has expanded our AC products to diverse end markets that are outside of those we historically served.

On February 25, 2022, we received \$10.6 million in cash from Norit as a result of the Change in Control, of which \$8.5 million represented full payment of an outstanding reimbursement amount related to reclamation of the Marshall Mine. As a result of the Change in Control, we recognized a loss of \$0.5 million in settlement of the outstanding reimbursement. The Change in Control did not impact any other provisions of the Supply Agreement.

Marshall Mine

Concurrently with the execution of the Supply Agreement, on September 30, 2020, we entered into the Mine Purchase Agreement from Cabot for 100% of the membership interests in Marshall Mine, LLC (the "Marshall Mine Acquisition") for a nominal purchase price. Marshall Mine, LLC owns a lignite mine located outside of Marshall, Texas (the "Marshall Mine"). We independently determined to immediately commenced activities to shutter the Marshall Mine and to incur the associated reclamation costs.

On September 2, 2022, we entered into a Purchase Agreement with a third party (the "MM Buyer") to sell all of our membership interests in Marshall Mine, LLC to the MM Buyer in exchange for a cash payment to be made by us to the MM Buyer of approximately \$2.4 million and the assumption by the MM Buyer of certain liabilities of Marshall Mine, LLC (the "MM Sale"). The MM Buyer previously operated the Marshall Mine on behalf of Marshall Mine, LLC and is currently performing reclamation under the Reclamation Contract. The Purchase Price is subject to adjustments for certain events that may occur during the period from the Agreement Date and the Closing Date.

The obligations of the Parties to close the MM Sale is subject to certain events, including (1) obtaining the approval of the Commission for an operating permit in the name of the MM Buyer or an affiliate of the MM Buyer; and (2) the MM Buyer replacing the Seller's surety bond with a reclamation performance bond, letter of credit or other form of security to which the MM Buyer or an affiliate of the MM Buyer is the principal that is satisfactory to the Commission. As of December 31, 2022, Marshall Mine, LLC had outstanding liabilities of approximately \$4.9 million, which we expect to be fully discharged upon payment of the MM Sale. We currently expect to close the MM Sale during the first half of 2023. However, since the Closing Date is uncertain, primarily due to the uncertain date for the Parties to receive approval of the MM Buyer's operating permit and surety bond by the Commission, we are unable to determine the accounting period in which we will recognize the MM Sale.

Significant Transactions Occurring in 2023

Arq Acquisition

As previously discussed in Part I - Item 1. "Business" ("Item 1") of this Report, on February 1, 2023, we executed the Purchase Agreement and completed the Arq Acquisition through the issuance to Arq Ltd. of shares of our common stock and Series A Preferred Stock in exchange for all of the direct and indirect equity interests of Arq Ltd.'s subsidiaries. We accounted for the Arq Acquisition as an acquisition of a business as of the Acquisition Date. The total Purchase Consideration was \$31.2 million based on the combined estimated fair values of the shares of Common Stock issued of \$12.4 million and the shares of Series A Preferred Stock issued of \$18.8 million.

Arq's principal office is located in London, United Kingdom, with additional offices located in Lexington and Corbin, Kentucky, near its main production facility. Arq is an environmental technology company that has developed a process for transforming coal waste into a purified, microfine carbon powder (Arq Powder) that can be used as an alternative to oil or in-ground mined coal to produce a range of carbon products. With the completion of the Arq Acquisition, we intend to first sell Arq Powder as a carbon filler for rubber composites and as a component for asphalt with an opportunity to evaluate expanding into other carbon products.

See further discussion of the Arq Acquisition and the material terms of the Series A Preferred Stock in Item 1.

PIPE Investment

As further described in Item 1 of this Report, on February 1, 2023, we closed the PIPE Investment for an aggregate purchase price of approximately \$15.4 million and at a purchase price per common share of \$4.00.

Loan Agreement

As further described in Item 1 of this Report, on February 1, 2023, ADES, as borrower, certain of its subsidiaries, as guarantors, and CF Global, as administrative agent and lender, entered into the Loan Agreement. The Term Loan has a term of 48 months and bears interest at a rate equal to either (a) Adjusted Term SOFR (subject to a 1.00% floor and a 2.00% cap) plus a margin of 9.00% paid in cash and 5.00% paid in kind or (b) Base Rate plus a margin of 8.00% paid in cash and 5.00% paid in kind, which interest on the Term Loan in each case shall be payable (or capitalized, in the case of in kind interest) quarterly in arrears. The Term Loan is secured by substantially all of the assets of ADES and its subsidiaries (including those acquired in the Transaction), subject to customary exceptions.

In addition, and in connection with the Loan Agreement and as consideration for the Term Loan, we agreed to issue CF Global the Warrant to purchase 325,457 shares of Common Stock. The Warrant has an exercise price of \$0.01 per share, subject to adjustment as set forth in the Warrant, is exercisable immediately and will expire on January 31, 2030. The terms of the Warrant do not allow for cash exercise, and the Warrant may only be exercised pursuant to the terms thereof.

See discussion of additional material terms of the Loan Agreement in "Liquidity and Capital Resources" of this Item 7 of this Report.

Termination of Transaction Agreement

As previously discussed in Item 1 of this Report, in connection with entry into the Purchase Agreement, the Transaction Agreement was terminated on February 1, 2023 pursuant to a termination agreement entered into by each of the parties to the Transaction Agreement. The Transaction Agreement would have provided, subject to its terms and conditions, for a business combination of Arq and ADES. By virtue of the termination of the Transaction Agreement, the Transaction Agreement became void and of no further force or effect, with no liability of the part of any party to the Transaction Agreement.

Components of Revenue, Expenses and Equity Method Investees

The following briefly describes the components of revenues, revenue and expenses as presented in the Consolidated Statements of Operations. Descriptions of the revenue recognition policies are included in Note 1 to the Consolidated Financial Statements included in Item 8 of this Report.

Revenues, Revenue and cost of revenues, revenue

Consumables

We sell. Our revenue is comprised of the sale of AC products and other chemical-based technology products in the APT market, as well as the sale of other AC products to a broad range of customers, including coal-fired utilities, industrials, water treatment plants and our largest customer, who services other diverse markets. Currently, our products mostly serve coal-fired utilities and other industrial boilers that allow the respective utilities to comply with the regulatory air emissions standards and water treatment plants to remove contaminants from the water. Additionally, we sell AC to Norit and its customers through the Supply Agreement.

Consumables cost of revenues, revenue

Consumables cost of revenues includes revenue is comprised of all labor, fringe benefits, subcontract labor, additive and coal costs, materials, equipment, supplies, travel costs and any other costs and expenses directly related to the Company's cost of production of revenues, consumables.

License royalties earned from Tinnuum Group

Through December 2021, we generated revenues from royalties ("M-45 Royalties") earned under a licensing arrangement ("M-45 License") of our M-45™ and M-45-PC™ emissions control technologies ("M-45 Technology") between us and Tinnuum Group, a related party. We recognized M-45 Royalties at a point in time based on the use of the M-45 Technology at certain RC facilities (the "M-45 Facilities") or through Tinnuum Group's use of licensed technology for rates in excess of amounts allowed for RC application. The amount of M-45 Royalties recognized was generally based on a percentage of pre-tax margins (as defined in the M-45 License) of the M-45 Facilities. With the expiration of the Section 45 tax credit program as of December 31, 2021, we no longer earn such royalties.

License royalties payable to Tinnuum Group

In December 2022, the Company and Tinnuum Group entered into an agreement (the "Tinnuum Group Royalty Agreement") whereby we pay Tinnuum Group a royalty (the "Tinnuum Group Royalty") for certain of our sales of its M-Prove™ products after the expiration of the tax credit program under IRC Section 45 ("Section 45 Tax Credit Program Program") (beginning January 1, 2022) to certain of the M-45 Facilities. The Tinnuum Group Royalty is calculated based on "Net Profit" (as defined in the Tinnuum Royalty Agreement) on our sales of M-Prove™ product to certain of the M-45 Facilities. The Tinnuum Group Royalty Agreement is for an initial term of five years with automatic renewals of five years unless we and Tinnuum Group agree to terminate it. The Tinnuum Group Royalty is included in Consumables cost of revenue.

Other Operating Expenses

Payroll and benefits

Payroll and benefits costs include personnel payroll costs, payroll related fringe benefits and stock based compensation expense of research and development, sales and administrative staff personnel, but exclude such costs related to direct labor costs and stock compensation expenses. Payroll and benefits costs exclude direct labor that are included in Cost of revenues.

revenue.

Legal and professional fees

Legal and professional costs include external legal, audit and consulting expenses.

General and administrative

General and administrative costs include director fees and expenses, bad debt expense, research and development expense and other general costs of conducting business. Research and development costs **provided by third parties**, net of reimbursements from cost-sharing arrangements, are charged to expense in the period incurred and are reported in the General and administrative line item in the Consolidated Statements of Operations.

Depreciation, amortization, depletion and accretion

Depreciation and amortization expense consists of depreciation expense related to property, plant and equipment and the amortization of long-lived intangible assets. Depletion and accretion expense consists of depletion expense related to the depletion of mine development costs and the accretion of mine reclamation liabilities.

Other Income (Expense), net

Earnings from equity method investments

Earnings from equity method investments represent our share of earnings (losses) related to **our equity method investments**, investments, and in 2023, primarily from Tinuum Group. Through December 31, 2021, we had substantial earnings from Tinuum Group and Tinuum **Services, Services, LLC ("Tinuum Services")**. With the expiration of the **Section 45** tax credit program **under IRC Section 45** afforded to producers of refined coal as of December 31, 2021, both Tinuum Group and Tinuum Services commenced winding down their operations related to the Section 45 tax credit program, although we have recognized earnings in **both 2022 and 2023** related to **residual** cash distributions received.

Other income (expense)

The remaining components of other income (expense) include interest income, interest expense and other miscellaneous items.

Results of Operations

Presentation of Financial Results

For comparison purposes, the following tables set forth our results of operations for the years presented in the Consolidated Financial Statements included in Item 8 of this Report. The year-to-year comparison of financial results is not necessarily indicative of financial results that may be achieved in future years. Our Annual Report on Form 10-K for the year ended **December 31, 2021** December 31, 2023 includes a discussion and analysis of our financial condition and results of operations for the year ended **December 31, 2021** December 31, 2023 compared to the year ended December 31, 2022, disclosed in Item 7 of Part II, "Management's Discussion and Analysis of Financial Condition and Results of Operations."

Year ended December 31, 2022 December 31, 2023 Compared to Year ended December 31, 2021 December 31, 2022

Total Revenues Revenue and Cost of Revenues Revenue

A summary of the components of **revenues revenue** and cost of revenue for the years ended **December 31, 2022** December 31, 2023 and **2021** 2022 is as follows:

(Amounts in thousands except percentages)	Years Ended December 31,		Change	
	2022	2021	(\$)	(%)
Revenues:				
Consumables	\$ 102,987	\$ 85,882	\$ 17,105	20 %
License royalties, related party	—	14,368	(14,368)	(100)%
Other	—	44	(44)	(100)%
Total revenues	<u>\$ 102,987</u>	<u>\$ 100,294</u>	<u>\$ 2,693</u>	<u>3 %</u>
Consumables cost of revenues, exclusive of depreciation and amortization	\$ 80,465	\$ 65,576	\$ 14,889	23 %

(Amounts in thousands except percentages)	Years Ended December 31,		Change	
	2023	2022	(\$)	(%)
Revenue:				
Consumables	\$ 99,183	\$ 102,987	\$ (3,804)	(4)%
Total revenue	<u>\$ 99,183</u>	<u>\$ 102,987</u>	<u>\$ (3,804)</u>	<u>(4)%</u>
Consumables cost of revenue, exclusive of depreciation and amortization	\$ 67,323	\$ 80,465	\$ (13,142)	(16)%

Consumables revenues revenue and consumables cost of revenues revenue

For the years ended **December 31, 2022** December 31, 2023 and **2021**, 2022, consumables revenue **increased decreased** year over year primarily driven by **higher lower** volumes sold, which comprised **\$11.8 million \$20.0 million** of the total change. Product volumes **were higher decreased** among power generation customers, primarily due to **higher lower** natural gas prices and higher demand for electricity compared to **2021**, 2022, which contributed to **increased decreased** utilization of coal-fired generation and **increased decreased** demand for our products. **Total consumables revenues also increased** Partially offsetting the decrease was an increase due to improved pricing for our products **by** of approximately **\$6.3 million \$10.6 million**, \$4.7 million of revenue recognized from 2021. Offsetting these increases to Consumable revenue was the settlement of certain contracts with customers containing minimum quantity purchases ("MQ Contracts") and the impact of **unfavorable favorable** product mix of approximately **\$1.4 million for the year ended December 31, 2022** compared to 2021. **\$0.7 million**.

Our Consumables gross margin, exclusive of depreciation and amortization, **decreased increased** for the year ended **December 31, 2022** December 31, 2023 compared to 2021. **For 2022**. Driving the **year ended December 31, 2022**, increase in gross margin were the impact of the MQ contracts and decreased cost of our feedstock and additives, primarily as

a result of decreased production volumes during 2023. Our consumables gross margin was negatively impacted by higher prices for key raw materials, transportation, including fuel, and other operational costs to produce and deliver our products, as well as an increase a decrease in the amount of third-party carbons purchased in order to meet customer demand for our products and supplement the higher operating utilization of the Red River Plant. Also negatively impacting Consumables gross margin for the year ended December 31, 2022 included \$0.8 million of Tinum Group Royalties. Offsetting these negative impacts were higher sales volumes increases in the prices of our products implemented during the first half of 2022 and incremental positive impact from net electricity generated, sold.

Consumables revenue continues to be affected by electricity demand, driven by seasonal weather and related power generation needs, as well as competitor prices related to alternative power generation sources such as natural gas and renewables.

For 2023, and based on current market estimates, we believe there will be a slight increase in Consumables revenue, driven by changes to customer and product mix, and overall improvements in pricing. However, we expect to see slight decreases in volumes compared to 2022 due to prices of alternative energy sources impacting the demand for our AC and chemical products related to power generation. There is risk to our outlook driven by inflationary pressures increasing our overall operating costs for our manufacturing operations as well as the impact of the 2023 Red River Plant turnaround.

License royalties, related party

As discussed above, Tinum Group ceased operation as of December 31, 2021, and as a result, we did not recognize any revenues from license royalties from Tinum Group for the year ended December 31, 2022.

Other Operating Expenses

A summary of the components of our operating expenses, exclusive of cost of revenues revenue items (presented above), for the years ended December 31, 2022 December 31, 2023 and 2021 2022 is as follows:

		Years Ended December 31,		Change													
		Years Ended December 31,															
(in thousands, except percentages)	(in thousands, except percentages)	2022	2021	(\$)	(%)	(in thousands, except percentages)	2023		2022								
Operating expenses:	Operating expenses:																
Payroll and benefits	Payroll and benefits																
Payroll and benefits	Payroll and benefits	\$10,540	\$11,315	\$ (775)	(7)%		\$ 15,154		\$ 10,540		\$ 4,614		44				
Legal and professional fees	Legal and professional fees	9,455	6,260	3,195	51 %		9,588	9,455	9,455	133			133	1			
General and administrative	General and administrative	8,145	7,060	1,085	15 %		12,641	8,145	8,145	4,496			4,496	55			
Depreciation, amortization, depletion and accretion	Depreciation, amortization, depletion and accretion	6,416	7,933	(1,517)	(19)%		10,543	6,416	6,416	4,127			4,127	64			
Loss (gain) on change in estimate, asset retirement obligation		34	(2,702)	2,736	(101)%												
Gain on sale of Marshall Mine, LLC	Gain on sale of Marshall Mine, LLC						(2,695)		—		(2,695)						
Other	Other	—					(36)		34		(70)						
		\$															
		\$															
		\$															
		\$34,590	\$29,866	\$4,724	16 %												
		\$					45,195		\$34,590		\$ 10,605		31				

* Calculation not meaningful

Payroll and benefits

Payroll and benefits expenses decreased increased year over year primarily due to the addition of Legacy Arq employees, which increased expenses by \$4.9 million for the year, of which \$1.1 million related to severance expense of former executives of Legacy Arq. In addition, for the year ended December 31, 2023, we incurred severance related costs of \$1.7 million associated with the termination of three executive employees. These increases were partially offset by a decrease in payroll-related expenses incentive compensation

related to non-Legacy Arq employees for the year ended December 31, 2023 of \$1.0 million as our headcount decreased year over year. Partially offsetting these decreases was an increase in expense of \$0.2 million related \$1.3 million compared to the Amended Retention Agreements, which were agreements between the Company corresponding period in 2022. An additional decrease in payroll and its benefits was due to retention bonuses with our executive officers and certain other key employees of \$1.2 million, which were paid in order to maintain the Company's business operations while it pursued and executed on its strategic initiatives.

full in January 2023.

Legal and professional fees

Legal and professional fees increased year over year as a result of an increase in costs incurred related to the Arq Acquisition. The increase was comprised mostly of legal and consulting fees of \$0.9 million and \$1.9 million, respectively. In addition, there was an increase in accounting related fees of approximately \$0.4 million remained flat year over year.

General and administrative

General and administrative expenses increased for the year ended December 31, 2023 compared to the corresponding period in 2022 as a result of \$2.5 million of expenses incurred on behalf of Legacy Arq, which included \$1.2 million from rent and occupancy expense from additional leased space. Additional increases period over year primarily period of approximately \$2.0 million were due to increases in insurance, research and development, travel, recruiting and other outside labor, and director compensation travel and recruiting expenses, of approximately \$0.7 million. Additionally, rent and occupancy related expenses increased year over year by \$0.3 million, as three new directors were added to the board in connection with the Arq Acquisition.

Depreciation, amortization, depletion and accretion

Depreciation and amortization expense decreased increased for the year over year ended December 31, 2023 compared to the corresponding period in 2022 primarily due to depreciation and amortization of approximately \$2.8 million from the addition of long-lived assets and intangible assets acquired in the Arq Acquisition. Also contributing to the increase was an increase in Depreciation and amortization expense due to higher production volumes during the year ended December 31, 2022, resulting compared to sales volumes which resulted in \$0.9 million less \$1.0 million additional absorption of depreciation in inventory. Further driving the decrease was a reduction in accretion expense

Gain on sale of \$0.5 million related to the reduction of the Marshall Mine, ARO compared to prior year and a decrease in amortization expense of \$0.4 million related to patents. Offsetting these decreases was an increase in depreciation expense of \$0.2 million related to fixed asset additions during LLC

As discussed above, for the year ended December 31, 2022.

Loss (gain) on change in estimate, asset retirement obligation

For the year ended December 31, 2022 December 31, 2023, we recorded a loss on change in estimate of \$34 thousand primarily based on a change in the timing of estimated payments for future reclamation requirements of the Marshall Mine.

For the year ended December 31, 2021, we recorded recognized a gain on change in estimate of \$2.7 million related to a reduction in scope on the sale of our estimated future reclamation efforts of the Marshall Mine, Mine, LLC.

Other Income (Expense), net

A summary of the components of our other income (expense), net for the years ended December 31, 2022 December 31, 2023 and 2021 2022 is as follows:

(Amounts in thousands, except percentages)	Years Ended December 31,		Change	
	2022	2021	(\$)	(%)
Other income (expense):				
Earnings from equity method investments	\$ 3,541	\$ 68,726	\$ (65,185)	(95)%
Gain on extinguishment of debt	—	3,345	(3,345)	(100)%
Interest expense	(336)	(1,490)	1,154	(77)%
Other	155	640	(485)	(76)%
Total other income	\$ 3,360	\$ 71,221	\$ (67,861)	(95)%

(Amounts in thousands, except percentages)	Years Ended December 31,		Change	
	2023	2022	(\$)	(%)
Other income, net:				
Earnings from equity method investments	\$ 1,623	\$ 3,541	\$ (1,918)	(54)%
Interest expense	(3,014)	(336)	(2,678)	797 %
Other	2,630	155	2,475	1,597 %
Total other income, net	\$ 1,239	\$ 3,360	\$ (2,121)	(63)%

Earnings from equity method investments

The following table presents the equity method earnings by investee for the years ended December 31, 2022 December 31, 2023 and 2021 2022:

(in thousands)	Years Ended December 31,		Change	
	Years Ended December 31,	Years Ended December 31,	Years Ended December 31,	Years Ended December 31,
(in thousands)				
(in thousands)				

(in thousands)	(in thousands)	2022	2021	(\$)	(%)
Earnings from Tiuuum Group	Earnings from Tiuuum Group	\$ 3,455	\$ 61,837	\$ (58,382)	(94) %
Earnings from Tiuuum Group					
Earnings from Tiuuum Group					
Earnings from Tiuuum Services	Earnings from Tiuuum Services	85	6,952	(6,867)	(99) %
Earnings (loss) from other		1	(63)	64	(102) %
Earnings from Tiuuum Services					
Earnings from Tiuuum Services					
Earnings from other					
Earnings from other					
Earnings from other					
Earnings from equity method investments	Earnings from equity method investments	\$ 3,541	\$ 68,726	\$ (65,185)	(95) %
Earnings from equity method investments					
Earnings from equity method investments					

For Earnings from equity method investments for the year ended December 31, 2022, we recognized \$3.5 million in equity earnings from Tiuuum Group compared to our proportionate share of Tiuuum Group's net loss of \$1.3 million for the year. For the year ended December 31, 2021, we recognized \$61.8 million in equity earnings from Tiuuum Group compared to our proportionate share of Tiuuum Group's net income of \$40.1 million. The difference between our pro-rata share of Tiuuum Group's net (loss) income December 31, 2023 and our equity earnings from Tiuuum Group as reported on the Consolidated Statements of Operations is the result of cumulative 2022 represented cash distributions received from Tiuuum Group being in excess of the carrying value of the investment, and therefore we recognize such excess distributions as equity method earnings in the period the distributions occur.

For the year ended December 31, 2022, we recognized \$0.1 million in equity earnings from Tiuuum Services. The decrease was primarily due to Tiuuum Group and Tiuuum Services compared continuing to our proportionate share of Tiuuum Services' net loss of \$0.1 million for this period. The difference between our pro-rata share of Tiuuum Services' net loss and our earnings from the Tiuuum Services equity method investment as reported on the Consolidated Statements of Operations is the result of cumulative distributions received from Tiuuum Services being in excess of the carrying value of the investment, and therefore we recognize such excess distributions as equity method earnings in the period the distributions occur. For the year ended December 31, 2021, we recognized \$7.7 million in equity earnings from Tiuuum Services, which was our proportionate share of Tiuuum Services' net income of \$15.4 million for the year.

As of December 31, 2021, we concluded the carrying amount of our investment in Tiuuum Services was not fully recoverable due to the remaining expected future cash distributions expected to be received as Tiuuum Services shuttered its wind down their operations in 2022 as a result of the expiration of the Section 45 tax credit period as of December 31, 2021. As a result, we wrote-down our investment in the amount of \$0.7 million, which is included in the "Earnings from equity method investments" line item in the Consolidated Statement of Operations for the year ended December 31, 2021.

Gain on extinguishment of debt

For the year ended December 31, 2021, we recorded a gain on extinguishment of debt in the amount of \$3.3 million from a loan that we had entered into during 2020 under the Paycheck Protection Program. The loan was formally forgiven in July 2021. 2023.

Interest expense

Interest expense decreased increased for the year over year by \$1.2 million ended December 31, 2023 compared to the corresponding period in 2022 primarily due to interest expense of \$2.0 million related to the pay-off \$10 million CFG Loan and interest expense of a senior term loan as \$0.5 million incurred for the same period related to the \$10 million CTB Loan assumed by us in the Arq Acquisition.

Other

The increase in Other is primarily driven by interest income of June 1, 2021. \$1.8 million generated from the use of cash sweep accounts in 2023.

Income tax expense

For the year ended December 31, 2023, our reported income tax expense was \$0.2 million and was based on an effective rate of (1)%. The difference between our reported income tax expense and the expected federal benefit, as a result of pretax loss recognized for the year ended December 31, 2023, was primarily due to permanent differences related to acquisition-related costs, an increase in the valuation allowance on our deferred tax assets and stock-based compensation.

For the year ended December 31, 2022, our reported income tax expense was \$0.2 million and was based on an effective rate of (2)%. The difference between our reported income tax expense and the expected federal benefit, as a result of pretax loss recognized for the year ended December 31, 2022 December 31, 2023, was primarily due to permanent differences related to acquisition-related costs and an increase in the valuation allowance on our deferred tax assets and state income taxes, net of federal benefit.

For the year ended December 31, 2021, our reported income tax expense of \$15.7 million and was based on an effective rate of 21%. While the Federal Rate was also 21%, our effective tax rate was primarily increased by state income tax expense, net of federal benefit and primarily decreased from a reduction in the valuation allowance on our deferred tax assets.

Accounting for income taxes requires that companies assess whether a valuation allowance should be recorded against their deferred tax asset based on an assessment of the amount of the deferred tax asset that is "more likely than not" to be realized. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount that is more likely than not to be realized.

We assess a valuation allowance recorded against deferred tax assets at each reporting date. The determination of whether a valuation allowance for deferred tax assets is appropriate requires the evaluation of positive and negative evidence that can be objectively verified. Consideration must be given to all sources of taxable income available to realize the deferred tax asset, including, as applicable, the future reversal of existing temporary differences, future taxable income forecasts exclusive of the reversal of temporary differences and carryforwards, taxable income in carryback years and tax planning strategies. In estimating taxes, we assess the relative merits and risks of the appropriate tax treatment of transactions taking into account statutory, judicial, and regulatory guidance.

As of **December 31, 2022** **December 31, 2023**, we concluded it is more likely than not we will not generate sufficient taxable income within the allowable carryforward periods to realize any of our net deferred tax assets, and fully reserved for such assets as of **December 31, 2022** **December 31, 2023**. In reaching this conclusion, we primarily considered forecasts of future taxable losses. As of **December 31, 2022** **December 31, 2023** and **2021** **2022**, we had a valuation allowance of **\$88.3 million** **\$98.8 million** and **\$87.5 million** **\$88.3 million**, respectively, on our deferred tax assets.

The ability to recognize the remaining deferred tax assets that continue to be subject to a valuation allowance is evaluated on a quarterly basis to determine if there are any significant events that would affect the ability to utilize those deferred tax assets. Our estimate of future taxable income or losses is based on internal projections that consider historical performance, assumptions on future performance and external data. If events are identified that affect our ability to utilize our deferred tax assets, or if additional deferred tax assets are generated, we update our analysis to determine if an increase to a valuation allowance is required. Such an increase could have a material adverse effect on our financial condition and results of operations. Conversely, better than expected results and continued positive results and trends could result in a decrease to a valuation allowance, and any such decreases could have a material positive effect on our financial condition and results of operations.

See additional discussion in Note 13 of the Consolidated Financial Statements included in Item 8 of this Report.

Tax Credits and Obligations Assets

Through December 31, 2021, we earned substantial tax credits under the Section 45 tax credit program, which **program** expired on December 31, 2021. As of **December 31, 2022** **December 31, 2023**, we had approximately \$86.1 million in Section 45 tax credit carryforwards.

In the hypothetical event of an **ownership "ownership change,"** as defined by IRC **Section Sections** 382, utilization of general business credits ("Tax Credits") generated prior to the change would be subject to an annual limitation imposed by IRC Section 383 for Tax Credits. **The results** in connection with the Arq Acquisition and PIPE Investment, we issued **additional shares of a recent** our common stock. We performed an IRC Section 382 analysis **indicated** as of the Acquisition Date and determined that we had not experienced an ownership change as of **December 31, 2022, as defined by IRC Section 382, that date.**

Prior to the Acquisition Date, Legacy Arq completed numerous equity offerings that resulted in ownership changes. We performed an have not completed a formal IRC Section 382 analysis **related to the of Legacy Arq Acquisition and PIPE Investment and determined we had not experienced an ownership change as of the Acquisition Date.**

Such analysis for the period equity changes from **its inception through** the Acquisition Date, **through** however, we believe that one or more "ownership changes" occurred during this time period as defined under Sections 382 and 383 and that a portion or all the date of this Report has not been completed. Therefore, it is possible that we experienced Legacy Arq Tax Assets may subject to an **ownership change between the Acquisition Date and the date of the filing of this Report, thus subjecting our Tax Credit carryforwards to annual** limitation.

Non-GAAP Financial Measures

To supplement our financial information presented in accordance with **accounting principles generally accepted in the United States** U.S. Generally Accepted Accounting Principles ("GAAP"), we provide **non-GAAP** certain supplemental financial measures, of certain financial performance. These non-GAAP measures include including EBITDA (EBITDA Loss) and Adjusted EBITDA, **(EBITDA Loss)** which are measurements that are not calculated in accordance with U.S. Generally Accepted Accounting Principles ("GAAP"). EBITDA is defined as earnings before interest, taxes, depreciation and amortization, and Adjusted EBITDA is defined as EBITDA reduced by the non-cash impact of equity earnings from equity method investments and gain on sale of the Marshall Mine, increased by cash distributions from equity method investments, loss on early settlement of a long-term receivable and loss on change in estimate, asset retirement obligations. EBITDA and Adjusted EBITDA should be considered in addition to, and not as a substitute for, net income in accordance with GAAP as a measure of performance. See below for a reconciliation from Net income, the nearest GAAP financial measure, to EBITDA and Adjusted EBITDA.

We **have included** believe that the EBITDA and Adjusted EBITDA measures are less susceptible to variances that affect the Company's operating performance. We include these non-GAAP measures because management **believes that** uses them in the evaluation of our operating performance, and believe they help to facilitate **period to period comparisons comparison** of our operating results **and between periods.** We believe the non-GAAP measures provide useful information to both management and users of the financial statements by excluding certain expenses, gains, and losses which can vary widely across different industries or among companies within the same industry and may not be indicative of core operating results and business outlook. **Management uses these non-GAAP measures in evaluating the performance of our business.**

These non-GAAP measures are not in accordance with, or an alternative to, measures prepared in accordance with GAAP and may be different from non-GAAP measures used by other companies. In addition, these non-GAAP measures are not based on any comprehensive set of accounting rules or principles. These measures should only be used to evaluate our results of operations in conjunction with the corresponding GAAP measures.

We define EBITDA (EBITDA Loss) as net income (loss) adjusted for the impact of the following items that are either non-cash or that we do not consider representative of our ongoing operating performance: depreciation, amortization, depletion, accretion, amortization of upfront customer consideration that was recorded as a component of the Marshall Mine Acquisition ("Upfront Customer Consideration"), interest expense, net and income tax expense. We define Adjusted EBITDA (EBITDA Loss) as EBITDA (EBITDA Loss), reduced by the non-cash impact of equity earnings from equity method investments, gain on change in estimate of asset retirement obligations and gain on extinguishment of debt, and increased by cash distributions from equity method investments, loss on early settlement of the Norit Receivable and the change in AROs as a result of a change in estimate. Because Adjusted EBITDA (EBITDA Loss) omits certain non-cash items, we believe that the measure is less susceptible to variances that affect our operating performance.

When used in conjunction with GAAP financial measures, we believe these non-GAAP measures are supplemental measures of operating performance which explain our operating performance for our period to period comparisons and against our competitors' performance. Generally, we believe these non-GAAP measures are less susceptible to variances that affect our operating performance results.

We expect the adjustments to EBITDA (EBITDA Loss) and Adjusted EBITDA (EBITDA Loss) in future periods will be generally similar. These non-GAAP measures have limitations as analytical tools and should not be considered in isolation or as a substitute for analyzing our results as reported under GAAP.

Reconciliation of Net (loss) income to (EBITDA Loss) EBITDA and Adjusted EBITDA

The following table reconciles net (loss) income, loss, our most directly comparable as-reported financial measure calculated in accordance with GAAP to EBITDA, (EBITDA Loss), (Adjusted EBITDA Loss) and Adjusted EBITDA.

		Year ended December 31,	
		2022	2021
Net (loss) income (1)		\$ (8,917)	\$60,401
		Year ended December 31,	
		Year ended December 31,	
		Year ended December 31,	
		2023	
		2023	
		2022	
Net loss (1)			
Depreciation, amortization, depletion and accretion	Depreciation, amortization, depletion and accretion	6,416	7,933
Amortization of Upfront Customer Consideration	Amortization of Upfront Customer Consideration	508	508
Interest expense, net	Interest expense, net	97	1,164
Income tax expense	Income tax expense	209	15,672
(EBITDA Loss) EBITDA		(1,687)	85,678
EBITDA (EBITDA Loss)			
Cash distributions from equity method investees	Cash distributions from equity method investees	5,933	74,026
Equity earnings	Equity earnings	(3,541)	(68,726)
Gain on extinguishment of debt		—	(3,345)
Gain on sale of Marshall Mine, LLC			
Loss (gain) on change in estimate, asset retirement obligation	Loss (gain) on change in estimate, asset retirement obligation	34	(2,702)
Loss on early settlement of Norit Receivable		535	—
Loss on early settlement of an account receivable			

Adjusted EBITDA	\$	1,274	\$84,931
Adjusted (EBITDA Loss) EBITDA			
Adjusted (EBITDA Loss) EBITDA			
Adjusted (EBITDA Loss) EBITDA			

(a) Included in Net loss for the year ended December 31, 2022 December 31, 2023 and 2022 was \$4.9 million and \$5.0 million, was \$5.0 million respectively, of transactions transaction and integration costs incurred related to the Arq Acquisition. Additionally, for the year ended December 31, 2023, Net loss included \$4.9 million of Legacy Arq payroll and benefit costs and \$1.7 million of severance expense related to three executive employees.

Liquidity and Capital Resources

Current Resources and Factors Affecting Our Liquidity

As of December 31, 2022 December 31, 2023, our principal future sources of liquidity included:

- cash on hand, excluding restricted cash of \$10.0 million \$8.8 million primarily pledged as collateral under a surety bond agreement; and
- our operations

For the year ended December 31, 2022 December 31, 2023, our principal uses of liquidity included:

- our business operating expenses;
- capital and spare parts expenditures;
- payments on our lease obligations; and
- payments for reclamation associated with the Five Forks Mine; and
- payment required under the sale of Marshall Mine, and Marshall Mine, LLC.

On February 1, 2023, in connection with the Arq Acquisition, we closed the PIPE Investment for an aggregate purchase price of \$15.4 million. Further, on February 1, 2023 we entered into the CFG Loan Agreement for \$10.0 million, \$10.0 million, of which we received \$8.5 million net proceeds.

Due to the expiration of the Section 45 tax credit period as of December 31, 2021, and the resultant wind down of Tinnuum Group's and Tinnuum Services' operations in 2022, distributions from Tinnuum Group and Tinnuum Services are no longer a significant source of liquidity.

Tinnuum Group and Tinnuum Services Distributions

The following table summarizes the cash distributions from our equity method investments for the years ended December 31, 2022 December 31, 2023 and 2021: 2022:

		Year ended December 31,	
		Year ended December 31,	
		Year ended December 31,	
		Year ended December 31,	
(in thousands)			
(in thousands)			
(in thousands)	(in thousands)	2022	2021
Tinnuum Group	Tinnuum Group	\$ 3,455	\$ 65,224
Tinnuum Group			
Tinnuum Group			
Tinnuum Services			
Tinnuum Services			
Tinnuum Services	Tinnuum Services	2,476	8,802
Other	Other	2	—
Other			
Other			
Distributions from equity method investees	Distributions from equity method investees	\$ 5,933	\$ 74,026
Distributions from equity method investees			
Distributions from equity method investees			

Cash distributions from Tinnuum Group and Tinnuum Services for 2022 2023 decreased by \$68.1 \$4.3 million compared to 2021 2022 primarily due to Tinnuum Group and Tinnuum Services ceasing material operations as of December 31, 2021.

Cash Flows

Cash and restricted cash decreased from \$88.8 million as of December 31, 2021, to \$76.4 million as of December 31, 2022, to \$54.2 million as of December 31, 2023, a decrease of \$12.3 million \$22.3 million. The following table summarizes our cash flows for the years ended December 31, 2022 December 31, 2023 and 2021, 2022, respectively:

Years Ended December 31,	
--------------------------	--

Years Ended December 31,				
Years Ended December 31,				
Years Ended December 31,				
(in thousands)	(in thousands)	2022	2021	Change
(in thousands)				
(in thousands)				
Cash provided by (used in):				
Cash provided by (used in):				
Cash provided by (used in):	Cash provided by (used in):			
Operating activities				
Operating activities				
Operating activities	Operating activities	\$ (6,061)	\$ 25,999	\$ (32,060)
Investing activities	Investing activities	(4,608)	44,378	(48,986)
Investing activities				
Investing activities				
Financing activities	Financing activities	(1,679)	(17,529)	15,850
Financing activities				
Financing activities				
Net change in Cash and Restricted Cash				
Net change in Cash and Restricted Cash				
Net change in Cash and Restricted Cash	Net change in Cash and Restricted Cash	\$ (12,348)	\$ 52,848	\$ (65,196)

Cash flows from operating activities

Cash flows used in operating activities for the year ended **December 31, 2022** December 31, 2023 was **\$6.1 million** \$16.7 million compared to cash flows **provided by used in** operating activities of **\$26.0 million** \$6.1 million for the year ended **December 31, 2021** December 31, 2022. The net decrease/increase in cash used in operating activities was primarily due to the following: (1) a net change/an increase in net income (loss) loss of **\$69.3 million** \$3.3 million year over year as year; (2) a result \$2.7 million gain on the sale of net loss recognized for the year ended December 31, 2022; (2) Marshall Mine, LLC; (3) a decrease in Distributions from equity method investees, return on investment of **\$20.6 million** \$2.3 million year over year; and (3) (4) a net decrease in the change in net working capital of **\$7.1 million** year over year. \$8.9 million primarily as a result of significant payments made in 2023 on accounts payable and accrued expenses assumed in the Arq Acquisition. Offsetting the net decrease/increase in cash flows used in operating activities year over year were (1) an increase in Depreciation, amortization, depletion and accretion of \$4.1 million; and (2) a decrease in Earnings from equity method investments of **\$65.2 million** and Gain on extinguishment of debt of \$3.3 million recorded in 2021. **\$1.9 million**.

Cash flows from investing activities

Cash flows used in investing activities for the year ended **December 31, 2022** December 31, 2023 was **\$4.6 million** \$28.5 million compared to cash flows **provided by used in** investing activities of **\$44.4 million** \$4.6 million for the year ended **December 31, 2021** December 31, 2022. The decrease/increase was primarily due to an increase in acquisition of property, equipment and intangibles, net, of \$18.6 million primarily related to acquisition costs related to the Arq Acquisition, a payment of \$2.2 million related to the disposal of Marshall Mine, LLC, increased mine development costs of \$2.1 million, and a decrease in distributions from equity earnings in excess of cumulative earnings of \$47.4 million and an \$2.0 million. Offsetting the net increase in **acquisitions of property and equipment** cash flows used in investing activities year over year, year was \$2.2 million cash acquired as part of the Arq Acquisition.

Cash flows from financing activities

Cash flows **used in provided by (used in)** financing activities for the year ended **December 31, 2022** decreased December 31, 2023 increased by **\$15.9 million** \$24.6 million compared to the year ended **December 31, 2021** December 31, 2022 primarily due to proceeds from common stock issued of \$16.2 million,

including \$1.0 million of proceeds from common stock issued to related parties, and net proceeds from the **pay-off** issuance of a senior term loan the CFG Loan Agreement of **\$16.0 million in 2021**. **\$8.5 million**.

Material Cash Requirements

Our ability to continue to generate sufficient cash flow required to meet ongoing operational needs and obligations depends upon several factors. These include executing on our contracts and initiatives and increasing our share of the market for APT consumables, including expanding our overall AC business into additional adjacent markets and **increasing our gross margin from** improving our customer and product mix.

We Based on current operating levels, we expect that our cash on hand as of **December 31, 2022**, as well as the cash proceeds related to the PIPE Investment and Term Loan, **December 31, 2023** will provide sufficient liquidity to fund operations for the next 12 months.

Capital expenditures

For 2023, We have targeted the end of 2024 for the completion of our Red River Plant expansion that is necessary to commence production of our new GAC products. To meet this target, we will incur substantial capital spend in excess of our originally forecasted amount for additional equipment, labor, and project costs. The Company anticipates financing the timely completion of the project funded with cash on hand, cash generation, ongoing cost reduction initiatives, potential customer prepayments for GAC contracts, and a planned refinancing and potential expansion of our term loan. If we are not able to secure additional financing, the project timeline for our Red River Plant expansion may be delayed beyond the end of 2024.

During 2024, we expect to spend between \$40.0 million\$45 and \$45.0 million in capital expenditures compared to \$9.5 million incurred in 2022. Of the capital expenditures forecasted in 2023, approximately 65% is expected to go towards growth projects as part of the Arq Acquisition and the remaining 35% is forecasted for improvements to \$50 million on the Red River Plant expansion, depending on the pace of the project, as well as between \$5 and Five Forks Mine, including\$10 million to complete our planned plant turnaround, commissioning of the Corbin Facility. Capital expenditures planned for 2023 2024 are dependent on many factors, including the ability to raise additional funding and approval of certain environmental permits. Approval permits, both of such permits can which may impact the timing and amount of capital expenditures.

Retention Agreements

In August 2022, we paid \$1.0 million pursuant to the payment terms of the Amended Retention Agreements. As of December 31, 2022, the remaining outstanding amount due under the Amended Retention Agreements was \$1.4 million, which was paid on January 27, 2023.

Five Forks Mine and Marshall Mine Reclamation Obligations Surety Bonds

As of December 31, 2022 December 31, 2023, we had outstanding surety bonds with regulatory commissions totaling \$24.1 million\$11.2 million primarily related to both the Five Forks Mine and Marshall Mine, the Corbin Facility. As of December 31, 2022 December 31, 2023, and as required by our surety bond provider, we held restricted cash of \$10.0 million\$8.5 million pledged as collateral related to performance requirements required under a reclamation contracts contract for both the Five Forks Mine and Marshall Mine, the Corbin Facility. We expect that the obligations secured by these surety bonds will be performed in the ordinary course of business and in accordance with the applicable contractual terms. To the extent that the obligations are performed, the related surety bonds should may be released and collateral requirements may be reduced. However, in the event any surety bond is called, our indemnity obligations could require us to reimburse the surety bond provider.

Long Term Requirements

We intend to fund our mine reclamation costs associated with both the Five Forks Mine and Marshall Mine from cash on hand. On September 2, 2022, we executed the sale of all For a discussion of our equity interests in Marshall Mine, LLC. We expect to close long-term cash requirements, see Item 8. Note 6 of this transaction in the first half of 2023 at which time, we expect to fully discharge all liabilities associated with reclamation and also reduce both the surety bond and collateral requirements, as we will only be obligated for future reclamation costs for the Five Forks Mine. Report.

Arq Reclamation

Contractual Obligations

As of the Acquisition Date, we assumed surety bonds of Arq held with regulatory commissions totaling approximately of \$3.0 million, of which approximately \$2.9 million are related to the Corbin facility.

Contractual obligations as of December 31, 2022 December 31, 2023 are as follows:

(in thousands)	Payment Due by Period				
	Total	Less than 1 year	1-3 years	4-5 years	After 5 years
Finance lease obligations	\$ 5,038	\$ 1,371	\$ 1,804	\$ 457	\$ 1,406
Operating lease obligations (1)	14,060	3,206	4,195	2,942	3,717
Reclamation obligation, Marshall Mine	4,679	4,679	—	—	—
	<u>\$ 23,777</u>	<u>\$ 9,256</u>	<u>\$ 5,999</u>	<u>\$ 3,399</u>	<u>\$ 5,123</u>

(1) Includes total rental payments of \$3.3 million under corporate headquarters and primary laboratory lease executed in November 2022 with lease commencement date of May 1, 2023.

(in thousands)	Payment Due by Period				
	Total	Less than 1 year	1-3 years	4-5 years	After 5 years
CFG Loan	\$ 12,199	\$ —	\$ —	\$ 12,199	\$ —
CTB Loan	13,413	1,110	2,220	2,220	7,863
Finance lease obligations	3,666	2,274	1,307	85	—
Operating lease obligations	18,559	3,139	5,747	2,595	7,078
	<u>\$ 47,837</u>	<u>\$ 6,523</u>	<u>\$ 9,274</u>	<u>\$ 17,099</u>	<u>\$ 14,941</u>

The table above excludes our asset retirement obligation ("ARO") related to reclamation of the Five Forks Mine, (the "Five Forks ARO"), as the timing and amount of payments to satisfy the Five Forks ARO are uncertain and are based on numerous factors including, but not limited to, the expected closure date of the Five Forks Mine expected closure date. Mine. As of December 31, 2022 December 31, 2023, our Consolidated Balance Sheet reflects a liability for AROs of \$3.9 million for \$6.2 million. Additionally, the Five Forks ARO, table above excludes construction costs related to the Red River Plant expansion and Corbin Facility commissioning referred to under "Capital Expenditures" caption above, as the timing and amount of payments

Loan Agreement

Under to satisfy these obligations are conditional and based on numerous factors including, but not limited to, the terms pace of construction activities and the timing of mechanical completion of the Term Loan, executed on February 1, 2023, we are permitted to prepay Red River Plant expansion and commissioning activities at the Term Loan at any time subject to the following prepayment premium: (i) prior to the twelve (12) month anniversary of the Closing Date, the Make-Whole Amount (as defined below), (ii) thereafter but prior to the thirty-six (36) month anniversary of the Closing Date, 2.00% of the outstanding principal amount of the Term Loan being repaid or prepaid or (iii) thereafter until the maturity

date, 1.00% of the outstanding principal amount of the Term Loan being repaid or prepaid. The "Make-Whole Amount", with respect to any repayment or prepayment, is (i) an amount equal to all required interest payable (except for currently accrued and unpaid interest) on the aggregate principal amount of the Term Loan subject to such prepayment or repayment from the date of such prepayment or repayment through but excluding the date that is the first anniversary of the Closing Date calculated using an interest rate equal to (x) Adjusted Term SOFR for an interest period of one month in effect on the third U.S. Government Securities Business Day prior to such prepayment or repayment plus (y) 14.00% per annum and assuming all interest was paid in cash, plus (ii) a prepayment premium of 2.00% on the aggregate principal amount of the Term Loan subject to such prepayment or repayment, **Corbin Facility**.

The Loan Agreement includes, among others, the following covenants: (1) beginning March 31, 2023 and as of the end of each fiscal quarter thereafter, we must maintain a minimum cash balance of \$5.0 million; (2) (x) as of December 31, 2023, for the fiscal year then ended, we must have a minimum annual revenue, on a consolidated basis, of \$70.0 million, (y) as of December 31, 2024, for the fiscal year then ended, we must have a minimum annual revenue, on a consolidated basis, of \$85.0 million and (z) for any fiscal year thereafter, we must have a minimum annual revenue, on a consolidated basis, of \$100.0 million; (3) (x) as of December 31, 2024, for the fiscal year then ended, we must have a minimum EBITDA of \$3.0 million and (y) for any fiscal year thereafter, we must have a minimum EBITDA of \$16.0 million; and (4) beginning after the fiscal quarter ending September 30, 2023, during an LTV Trigger Period, we must not exceed a loan to value (based on the consolidated total assets of ADES and its subsidiaries) ratio of 0.40:1.00.

Critical Accounting Policies and Estimates

Our significant accounting policies are discussed in Note 1 to the Consolidated Financial Statements included in Item 8 of this Report. In presenting our financial statements in conformity with GAAP, we are required to make estimates and assumptions that affect the amounts reported therein. Several of the estimates and assumptions we are required to make relate to matters that are inherently uncertain as they pertain to future events. Our estimates are based on historical experience and other assumptions believed to be reasonable under the circumstances, and we evaluate these estimates on an ongoing basis. Actual results may differ from these estimates under different assumptions or conditions.

We believe that the accounting estimates discussed below are critical to understanding our historical and future performance, as these estimates relate to the more significant areas involving management's judgments and estimates.

Business Combinations, including asset acquisitions

We apply the acquisition method to acquisitions of both businesses and assets and allocate the purchase price to the tangible and intangible assets acquired and liabilities assumed based on their estimated fair values at the acquisition date. The purchase price allocation process requires us to make significant estimates and assumptions with respect to assets acquired and liabilities assumed. We believe the assumptions and estimates we make are reasonable, they are based in part on historical experience, market conditions and information obtained from management of the acquired company or group of assets and are inherently uncertain.

Examples of critical estimates in valuing certain of long-lived assets, including intangible assets, we have acquired or may acquire in the future include but are not limited to:

- future expected cash flows from **revenues**;
- **historical and expected customer attrition rates and anticipated growth in revenues from acquired customers; revenue**;
- the acquired company's developed technology as well as assumptions about the period of time the acquired developed technology will continue to be used in the combined company's product portfolio;
- the expected use and useful lives of the acquired assets; and
- valuation methods and discount rates used in estimating the values of the assets acquired and liabilities assumed.

In regard to the Marshall Mine Acquisition, which we accounted for as an asset acquisition, we recorded the fair value of assumed assets, which included property, plant and equipment and spare parts and assumed liabilities. In addition, we recorded other assets, including Upfront Customer Consideration and the Cabot Receivable, and a liability for the **Marshall Mine ARO**.

Carrying value of long-lived assets and intangibles

We review and evaluate our long-lived assets and intangibles for impairment at least annually, or more frequently when events or changes in circumstances indicate that the related carrying amounts may not be recoverable. An impairment loss is measured and recorded for long-lived assets and intangibles based on the excess of their carrying amounts over their estimated fair values. Fair value is typically determined through the use of an income approach utilizing estimates of discounted pretax future cash flows or a market approach utilizing recent transaction activity for comparable assets.

Asset Retirement Obligations

Accounting for AROs requires us to make estimates of future costs unique to a specific mining operation that we will incur to complete the reclamation and remediation work required to comply with existing laws and regulations. Any such changes in future costs, the timing of reclamation activities, scope or the exclusion of certain costs not considered reclamation and remediation costs could materially impact the amounts charged to earnings for reclamation and remediation. Additionally, future changes to environmental laws and regulations could increase the scope of reclamation and remediation work required.

Five Forks Mine ARO - Reclamation costs related to **the Five Forks Mine ARO AROs** are allocated to expense over the life of the related mine assets and are periodically adjusted to reflect changes in the estimated present value resulting from the passage of time and revisions to the estimates of either the timing or amount of the reclamation costs. Remediation costs **for the Five Forks Mine** are accrued based on management's best estimate of the costs expected to be incurred. Such cost estimates may include ongoing care, maintenance and monitoring costs. Reclamation obligations are based on the timing of estimated spending for an existing environmental disturbance. We review, on at least an annual basis, the future expected costs and the timing of such costs for **the Five Forks Mine ARO AROs**.

Marshall Mine ARO - Reclamation costs related to the Marshall Mine are based on a capped fee structure for a significant portion of the ARO liability based on the initial estimate of the total costs of reclamation, which provides for certain contingencies that could increase or decrease the reclamation fee based on the reclamation agreement executed between us and the Marshall Mine operator. The timing of payments may vary, and in valuing the Marshall Mine ARO, we account for these timing differences, as well as changes in actual reclamation costs, on a quarterly basis.

Income Taxes

We account for income taxes under the asset and liability method, which requires judgment in determining income tax expense and the related balance sheet amounts. This includes estimating and analyzing historical and projected future operating results, the reversal of taxable temporary differences, tax planning strategies, and the ultimate outcome of uncertain income tax positions. Actual income taxes paid may vary from estimates depending on changes in income tax laws, actual results of operations, state apportionment and, if applicable, final audits of tax returns by taxing authorities. Tax assessments may arise several years after tax returns have been filed. Changes in the estimates and assumptions used for calculating income tax expense and potential differences in actual results from estimates could have a material impact on our results of operations and financial condition.

We recognize deferred tax assets to the extent that we believe these assets are more likely than not to be realized. In making such a determination, we consider all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies and results of recent operations.

We establish a valuation allowance against our deferred tax assets when, based upon the weight of all available evidence, we believe it is more likely than not that some portion or all of the deferred tax assets will not be realized. In making this determination, we consider the relative impact of all of the available positive and negative evidence regarding future sources of taxable income and tax planning strategies. However, there could be a material impact to our effective tax rate if there is a significant change in our estimates of future taxable income. If and when our estimates change, or there is a change in the value of deferred tax assets or liabilities warranting the need to reassess the realizability of deferred tax assets, we adjust a valuation allowance through the provision for income taxes in the period in which this determination is made. Refer to Note 13 of our Consolidated Financial Statements included in Item 8 of this Report for additional information regarding our deferred tax assets and [liabilities and related deferred income tax expense \(benefit\), liabilities.](#)

Recently Issued Accounting Standards

Refer to Note 1 of the Consolidated Financial Statements included in Item 8 of this Report for information regarding recently issued accounting standards.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

The information under this Item is not required to be provided by smaller reporting companies.

Item 8. Financial Statements and Supplementary Data

Advanced Emissions Solutions, Arq, Inc.

Index to Financial Statements

Advanced Emissions Solutions, Arq, Inc.

Consolidated Financial Statements:

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Consolidated Statements of Changes in Stockholders' Equity for the years ended December 31, 2022 December 31, 2023 and 2021 2022	50	44
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Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of

[Advanced Emissions Solutions, Arq, Inc. and Subsidiaries](#)

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of [Advanced Emissions Solutions, Arq, Inc. and subsidiaries](#) (the "[Company](#)") [Company](#)) as of [December 31, 2022](#) [December 31, 2023](#) and [2021](#), 2022, the related consolidated statements of operations, changes in stockholders' equity, and cash flows for the years then ended, and the related notes (collectively referred to as the "[consolidated consolidated financial statements](#)") [statements](#)). In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as of [December 31, 2022](#) [December 31, 2023](#) and [2021](#), 2022, and the consolidated results of its operations and its cash flows for the years then ended, in conformity with accounting principles generally accepted in the United States of America.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the Company's internal control over financial reporting as of December 31, 2022, based on criteria established in [America Internal Control - Integrated Framework \(2013\)](#) issued by the Committee of Sponsoring Organizations of the Treadway Commission and our report dated March 8, 2023 expressed an unqualified opinion on the Company's internal control over financial reporting.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company's management. Our responsibility is to express an opinion on the Company's consolidated financial statements based on our audits. We are a public accounting firm registered with the [PCAOB Public Company Accounting Oversight Board \(United States\)](#) (PCAOB) and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. [The Company is not required to have, nor were we engaged to perform, an audit of its internal control over financial reporting. As part of our audits, we are required to obtain an understanding of internal control over financial reporting but not for the purpose of expressing an opinion on the effectiveness of the Company's internal control over financial reporting. Accordingly, we express no such opinion.](#)

Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures to respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters Matter

Critical The critical audit matters are matters matter communicated below is a matter arising from the current period audit of the consolidated financial statements that were was communicated or required to be communicated to the audit committee and that (1) relate relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there are no The communication of critical audit matters. matters does not alter in any way our opinion on the consolidated financial statements, taken as a whole, and we are not, by communicating the critical audit matter below, providing a separate opinion on the critical audit matter or on the accounts or disclosures to which it relates.

Business Combination – Valuation of Acquired Property, Plant, and Equipment and Developed Technology Intangible Asset

As described in Notes 1 and 2 to the consolidated financial statements, in February 2023, the Company acquired 100% of the equity of the subsidiaries of Arq Ltd. (the “Arq Acquisition”) in exchange for total consideration of \$31.2 million. The Company accounted for the Arq Acquisition as an acquisition of a business and recorded the assets acquired and liabilities assumed at their respective fair values, including \$39.2 million of property, plant, and equipment, and a \$7.7 million developed technology intangible asset.

Management estimated the fair value of the acquired property, plant and equipment using a combination of valuation methodologies, including the cost and market approaches and the fair value of the developed technology intangible asset using an income approach. The significant assumptions used by management in determining the fair value of the acquired property, plant and equipment primarily included estimated replacement costs and sales prices of the acquired assets as well as the estimated useful lives of the acquired assets. The significant assumptions used by management in determining the fair value of the developed technology intangible asset included the Company’s best estimate of projected financial information, including revenues, growth rates, production ramp-up and capacity, and cost of revenue as well as discount and royalty rates.

The principal considerations for our determination that performing procedures relating to the valuation of the acquired property, plant and equipment and developed technology intangible asset relating to the Arq Acquisition is a critical audit matter are (i) the significant judgment by management when determining the significant assumptions used in projecting future financial performance of the acquired business; (ii) especially challenging and subjective auditor judgment involved when performing procedures and evaluating management’s significant assumptions related to revenue and its growth rate, production ramp-up and capacity, and cost of revenue, and the discount and royalty rates utilized; and (iii) involving the use of professionals with specialized skill and knowledge.

The primary procedures we performed to address this critical audit matter included:

- Obtaining and reading the Securities Purchase Agreement to develop an understanding of the Arq Acquisition.
- Evaluating management’s process for determining the fair value of the acquired property, plant and equipment and developed technology intangible asset, including the appropriateness of the valuation methods used.
- Testing the completeness and accuracy of the underlying data used in the valuation models.
- Evaluating the reasonableness of the significant assumptions used by management related to projected financial information, which primarily related to production ramp-up and capacity, revenue growth, cost of revenues and the discount and royalty rates. Specifically, when evaluating the assumptions related to production ramp-up and capacity and revenue growth rates, we compared the assumptions to industry and market trends, along with updated management forecasts, to evaluate the reasonableness of management’s estimates as of the date of the transaction.
- Utilizing professionals with specialized skill and knowledge to assist in evaluating the appropriateness of the valuation models used and the reasonableness of certain significant assumptions including estimated replacement costs and sales prices as well as discount and royalty rates.

/s/ Moss Adams LLP

Denver, Colorado
March 8, 2023 12, 2024

We have served as the Company’s auditor since 2017.

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries
Consolidated Balance Sheets

As of December 31,		As of		As of December 31,	
		December 31,			
(in thousands, except share data)	(in thousands, except share data)	2022	2021	(in thousands, except share data)	2023
ASSETS	ASSETS				2022
Current assets:	Current assets:				
Current assets:					
Current assets:					
Cash					

Cash			
Cash	Cash	\$ 66,432	\$ 78,753
Receivables, net	Receivables, net	13,864	12,622
Receivables, related party		—	2,481
Receivables, net			
Receivables, net			
Inventories, net			
Inventories, net			
Inventories, net	Inventories, net	17,828	7,850
Prepaid expenses and other current assets	Prepaid expenses and other current assets	7,538	6,661
Prepaid expenses and other current assets			
Prepaid expenses and other current assets			
Total current assets	Total current assets	105,662	108,367
Restricted cash, long-term	Restricted cash, long-term	10,000	10,027
Property, plant and equipment, net of accumulated depreciation of \$11,897 and \$7,684, respectively		34,855	30,171
Property, plant and equipment, net of accumulated depreciation of \$19,293 and \$11,897, respectively			
Other long-term assets, net			
Other long-term assets, net			
Other long-term assets, net	Other long-term assets, net	30,647	36,871
Total Assets	Total Assets	\$181,164	\$185,436
LIABILITIES AND STOCKHOLDERS' EQUITY	LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:	Current liabilities:		
Current liabilities:			
Current liabilities:			
Accounts payable and accrued expenses			
Accounts payable and accrued expenses			
Accounts payable and accrued expenses	Accounts payable and accrued expenses	\$ 16,108	\$ 16,486
Current portion of long-term debt	Current portion of long-term debt	1,131	1,011
Current portion of long-term debt			
Current portion of long-term debt			

Other current liabilities			
Other current liabilities			
Other current liabilities	Other current liabilities	6,645	5,124
Total current liabilities	Total current liabilities	23,884	22,621
Long-term debt, net of current portion	Long-term debt, net of current portion	3,450	3,152
Other long-term liabilities	Other long-term liabilities	13,851	12,362
Other long-term liabilities			
Other long-term liabilities			
Total Liabilities	Total Liabilities	41,185	38,135
Commitments and contingencies (Note 7)			
Commitments and contingencies (Note 8)			
Commitments and contingencies (Note 8)			
Stockholders' equity:	Stockholders' equity:		
Preferred stock: par value of \$.001 per share, 50,000,000 shares authorized, none outstanding	Preferred stock: par value of \$.001 per share, 50,000,000 shares authorized, none outstanding	—	—
Common stock: par value of \$.001 per share, 100,000,000 shares authorized, 23,788,319 and 23,460,212 shares issued and 19,170,173 and 18,842,066 shares outstanding at December 31, 2022 and 2021, respectively	Common stock: par value of \$.001 per share, 100,000,000 shares authorized, 23,788,319 and 23,460,212 shares issued and 19,170,173 and 18,842,066 shares outstanding at December 31, 2022 and 2021, respectively	24	23
Treasury stock, at cost: 4,618,146 and 4,618,146 shares as of December 31, 2022 and 2021, respectively	Treasury stock, at cost: 4,618,146 and 4,618,146 shares as of December 31, 2022 and 2021, respectively	(47,692)	(47,692)
Preferred stock: par value of \$.001 per share, 50,000,000 shares authorized, none outstanding			
Preferred stock: par value of \$.001 per share, 50,000,000 shares authorized, none outstanding			

Common stock: par value of \$.001 per share, 100,000,000 shares authorized, 37,791,084 and 23,788,319 shares issued and 33,172,938 and 19,170,173 shares outstanding at December 31, 2023 and 2022, respectively Treasury stock, at cost: 4,618,146 and 4,618,146 shares as of December 31, 2023 and 2022, respectively			
Additional paid- in capital	Additional paid- in capital	103,698	102,106
Retained earnings	Retained earnings	83,949	92,864
Total stockholders' equity	Total stockholders' equity	139,979	147,301
Total stockholders' equity			
Total stockholders' equity			
Total Liabilities and Stockholders' equity	Total Liabilities and Stockholders' equity	\$181,164	\$185,436

See Notes to the Consolidated Financial Statements.

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries
Consolidated Statements of Operations

	Years Ended December 31,	
	Years Ended December 31,	
	Years Ended December 31,	
(in thousands, except per share data)		
(in thousands, except per share data)		
(in thousands, except per share data)		
Revenue:		
Revenue:		
Revenue:		
Consumables		
Consumables		
Consumables		
	Years Ended December 31,	
(in thousands, except per share data)	2022	2021
Revenues:		
Consumables	\$ 102,987	\$ 85,882
License royalties, related party	—	14,368

Other		—	44
Total revenues		102,987	100,294
Total revenue			
Total revenue			
Total revenue			
Operating expenses:	Operating expenses:		
Consumables cost of revenues, exclusive of depreciation and amortization		80,465	65,576
Operating expenses:			
Operating expenses:			
Consumables cost of revenue, exclusive of depreciation and amortization			
Consumables cost of revenue, exclusive of depreciation and amortization			
Consumables cost of revenue, exclusive of depreciation and amortization			
Payroll and benefits			
Payroll and benefits			
Payroll and benefits	Payroll and benefits	10,540	11,315
Legal and professional fees	Legal and professional fees	9,455	6,260
Legal and professional fees			
Legal and professional fees			
General and administrative			
General and administrative			
General and administrative	General and administrative	8,145	7,060
Depreciation, amortization, depletion and accretion	Depreciation, amortization, depletion and accretion	6,416	7,933
Loss (gain) on change in estimate, asset retirement obligation		34	(2,702)
Depreciation, amortization, depletion and accretion			
Depreciation, amortization, depletion and accretion			
Gain on sale of Marshall Mine, LLC			
Gain on sale of Marshall Mine, LLC			
Gain on sale of Marshall Mine, LLC			
Other			
Other			
Other			
Total operating expenses	Total operating expenses	115,055	95,442
Operating (loss) income		(12,068)	4,852
Other income (expense):			
Total operating expenses			
Total operating expenses			
Operating loss			
Operating loss			
Operating loss			
Other income, net:			
Other income, net:			
Other income, net:			

Earnings from equity method investments	Earnings from equity method investments	3,541	68,726
Gain on extinguishment of debt		—	3,345
Earnings from equity method investments			
Earnings from equity method investments			
Interest expense			
Interest expense			
Interest expense	Interest expense	(336)	(1,490)
Other	Other	155	640
Total other income		3,360	71,221
(Loss) income before income tax expense		(8,708)	76,073
Other			
Other			
Total other income, net			
Total other income, net			
Total other income, net			
Loss before income tax expense			
Loss before income tax expense			
Loss before income tax expense			
Income tax expense	Income tax expense	209	15,672
Net (loss) income		\$ (8,917)	\$ 60,401
(Loss) earnings per common share (Note 1):			
Income tax expense			
Income tax expense			
Net loss			
Net loss			
Net loss			
Loss per common share (Note 1):			
Loss per common share (Note 1):			
Loss per common share (Note 1):			
Basic			
Basic			
Basic	Basic	\$ (0.48)	\$ 3.31
Diluted	Diluted	\$ (0.48)	\$ 3.27
Diluted			
Diluted			
Weighted-average number of common shares outstanding:			
Weighted-average number of common shares outstanding:			
Weighted-average number of common shares outstanding:	Weighted-average number of common shares outstanding:		
Basic	Basic	18,453	18,258
Basic			
Basic			
Diluted			
Diluted			
Diluted	Diluted	18,453	18,461

See Notes to the Consolidated Financial Statements.

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries

		Treasury Stock														
									Common Stock							
									Common Stock							
									Common Stock							
(in thousands, except share data)																
(in thousands, except share data)																
(in thousands, except share data)	(in thousands, except share data)					Additional Paid-in Capital	Retained Earnings/(Accumulated Deficit)	Total Stockholders' Equity					Additional Paid-in Capital	Retained Earnings/(Accumulated Deficit)	Totals	
Balances, January 1, 2021		Shares	Amount	Shares	Amount					Shares	Amount	Shares	Amount			
		23,141,284	\$ 23	(4,618,146)	\$(47,692)	\$100,425	\$ 32,454	\$ 85,210								
Balances, January 1, 2022																
Balances, January 1, 2022																
Balances, January 1, 2022																
Stock-based compensation	Stock-based compensation	364,657	—	—	—	1,927	—	1,927								
Stock-based compensation																
Stock-based compensation																
Repurchase of common shares to satisfy tax withholdings																
Repurchase of common shares to satisfy tax withholdings																
Repurchase of common shares to satisfy tax withholdings	Repurchase of common shares to satisfy tax withholdings	(45,729)	—	—	—	(246)	—	(246)								
Accrued dividends cancelled on common stock	Accrued dividends cancelled on common stock	—	—	—	—	—	9	9								
Net income		—	—	—	—	—	60,401	60,401								
Balances, December 31, 2021		23,460,212	\$ 23	(4,618,146)	\$(47,692)	\$102,106	\$ 92,864	\$ 147,301								
Stock-based compensation		389,312	1	—	—	1,980	—	1,981								
Repurchase of common shares to satisfy tax withholdings		(61,205)	—	—	—	(388)	—	(388)								
Accrued dividends cancelled on common stock																
Accrued dividends cancelled on common stock	Accrued dividends cancelled on common stock	—	—	—	—	—	2	2								
Net loss	Net loss	—	—	—	—	—	(8,917)	(8,917)								
Net loss																
Net loss																

Balances, December 31, 2022	Balances, December 31, 2022	23,788,319	\$ 24	(4,618,146)	\$(47,692)	\$103,698	\$	83,949	\$	139,979
Issuance of common stock upon conversion of preferred stock										
Issuance of common stock related to PIPE										
Investment, net of offering costs										
Issuance of common stock pursuant to Arq										
Acquisition, net of offering costs										
Stock-based compensation										
Issuance of common stock to related party										
Repurchase of common shares to satisfy tax withholdings										
Repurchase of common shares to satisfy tax withholdings										
Repurchase of common shares to satisfy tax withholdings										
Issuance of warrant										
Preferred stock dividends declared on redeemable preferred stock										
Net loss										
Net loss										
Net loss										
Balances, December 31, 2023										

See Notes to the Consolidated Financial Statements.

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries
Consolidated Statements of Cash Flows

		Years Ended December 31,	
		Years Ended December 31,	
		Years Ended December 31,	
		Years Ended December 31,	
(in thousands)			
(in thousands)			
(in thousands)	(in thousands)	2022	2021
Cash flows from operating activities	Cash flows from operating activities		
Net (loss) income		\$ (8,917)	\$ 60,401
Adjustments to reconcile net (loss) income to net cash (used in) provided by operating activities:			
Cash flows from operating activities			
Cash flows from operating activities			
Net loss			
Net loss			
Net loss			
Adjustments to reconcile net loss to net cash used in operating activities:			
Adjustments to reconcile net loss to net cash used in operating activities:			
Adjustments to reconcile net loss to net cash used in operating activities:			
Depreciation, amortization, depletion and accretion	Depreciation, amortization, depletion and accretion	6,416	7,933
Depreciation, amortization, depletion and accretion			
Depreciation, amortization, depletion and accretion			
Operating lease expense			
Operating lease expense			
Operating lease expense			
Gain on sale of Marshall Mine, LLC			
Gain on sale of Marshall Mine, LLC			
Gain on sale of Marshall Mine, LLC			
Stock-based compensation expense			
Stock-based compensation expense			
Stock-based compensation expense			
Earnings from equity method investments	Earnings from equity method investments	(3,541)	(68,726)
Operating lease expense		2,709	2,038
Stock-based compensation expense		1,981	1,927
Loss (gain) on change in estimate, asset retirement obligation		34	(2,702)
Deferred income tax expense		—	10,604
Earnings from equity method investments			
Earnings from equity method investments			
Amortization of debt discount and debt issuance costs	Amortization of debt discount and debt issuance costs	—	945
Gain on extinguishment of debt		—	(3,345)
Amortization of debt discount and debt issuance costs			

Amortization of debt discount and debt issuance costs			
Other non-cash items, net	Other non-cash items, net	496	(209)
Changes in operating assets and liabilities:			
Receivables, net		(1,312)	540
Related party receivables		2,481	972
Prepaid expenses and other current assets		(876)	(2,064)
Inventories, net		(9,686)	1,394
Other long-term assets, net		245	(4,270)
Accounts payable and accrued expenses		(911)	5,197
Other current liabilities		1,008	(8,279)
Operating lease liabilities		1,521	3,344
Other long-term liabilities		(6)	(2,645)
Distributions from equity method investees, return on investment		2,297	22,944
Net cash (used in) provided by operating activities			
	\$	(6,061)	\$ 25,999
Other non-cash items, net			
Other non-cash items, net			
Changes in operating assets and liabilities:			
Changes in operating assets and liabilities:			
Changes in operating assets and liabilities:			
Receivables and related party receivables			
Receivables and related party receivables			
Receivables and related party receivables			
Prepaid expenses and other current assets			
Prepaid expenses and other current assets			
Prepaid expenses and other current assets			
Inventories, net			
Inventories, net			
Inventories, net			
Other long-term assets, net			
Other long-term assets, net			
Other long-term assets, net			
Accounts payable and accrued expenses			
Accounts payable and accrued expenses			
Accounts payable and accrued expenses			
Other current liabilities			
Other current liabilities			
Other current liabilities			
Operating lease liabilities			
Operating lease liabilities			
Operating lease liabilities			
Other long-term liabilities			
Other long-term liabilities			
Other long-term liabilities			
Distributions from equity method investees, return on investment			
Distributions from equity method investees, return on investment			

Distributions from equity method investees, return on investment
Net cash used in operating activities
Net cash used in operating activities
Net cash used in operating activities
Cash flows from investing activities
Cash flows from investing activities
Cash flows from investing activities
Acquisition of property, equipment and intangible assets, net
Acquisition of property, equipment and intangible assets, net
Acquisition of property, equipment and intangible assets, net
Mine development costs
Mine development costs
Mine development costs
Cash and restricted cash acquired in acquisition of business
Cash and restricted cash acquired in acquisition of business
Cash and restricted cash acquired in acquisition of business
Payment for disposal of Marshall Mine, LLC
Payment for disposal of Marshall Mine, LLC
Payment for disposal of Marshall Mine, LLC
Distributions from equity method investees in excess of cumulative earnings
Distributions from equity method investees in excess of cumulative earnings
Distributions from equity method investees in excess of cumulative earnings
Proceeds from sale of property and equipment
Proceeds from sale of property and equipment
Proceeds from sale of property and equipment
Net cash used in investing activities
Net cash used in investing activities
Net cash used in investing activities

	Years Ended December 31,	
	Years Ended December 31,	
	Years Ended December 31,	
	Years Ended December 31,	
(in thousands)	(in thousands)	
	2022	2021
Cash flows from investing activities		
Distributions from equity method investees in excess of cumulative earnings	\$ 3,636	\$ 51,082
Acquisition of property, equipment and intangible assets, net	(8,914)	(6,201)
Mine development costs	(583)	(1,398)
Proceeds from sale of property and equipment	1,253	895
Net cash (used in) provided by investing activities	(4,608)	44,378

(in thousands)			
(in thousands)			
Cash flows from financing activities	Cash flows from financing activities		
Principal payments on term loan		—	(16,000)
Cash flows from financing activities			
Cash flows from financing activities			
Net proceeds from common stock issuance			
Net proceeds from common stock issuance			
Net proceeds from common stock issuance			
Net proceeds from CFG Loan, related party, net of discount and issuance costs			
Net proceeds from CFG Loan, related party, net of discount and issuance costs			
Net proceeds from CFG Loan, related party, net of discount and issuance costs			
Principal payments on finance lease obligations	Principal payments on finance lease obligations	(1,246)	(1,190)
Principal payments on finance lease obligations			
Principal payments on finance lease obligations			
Net proceeds from common stock issuance, related party			
Net proceeds from common stock issuance, related party			
Net proceeds from common stock issuance, related party			
Principal payments on Arq Loan			
Principal payments on Arq Loan			
Principal payments on Arq Loan			
Repurchase of shares to satisfy tax withholdings	Repurchase of shares to satisfy tax withholdings	(388)	(246)
Repurchase of shares to satisfy tax withholdings			
Repurchase of shares to satisfy tax withholdings			
Dividends paid			
Dividends paid			
Dividends paid	Dividends paid	(45)	(93)
Net cash used in financing activities		(1,679)	(17,529)
(Decrease) increase in Cash and Restricted Cash		(12,348)	52,848
Cash and Restricted Cash, beginning of year		88,780	35,932
Cash and Restricted Cash, end of year		\$ 76,432	\$ 88,780
Supplemental disclosure of cash flow information:			
Cash paid for interest	\$	334	\$ 524
Cash paid for income taxes	\$	3	\$ 8,882
Supplemental disclosure of non-cash investing and financing activities:			
Acquisition of property and equipment under finance lease	\$	1,641	\$ —
Change in accrued purchases for property and equipment	\$	532	\$ 183
Change in asset retirement obligation	\$	—	\$ 121
Net cash provided by (used in) financing activities			

Net cash provided by (used in) financing activities
Net cash provided by (used in) financing activities
Decrease in Cash and Restricted Cash
Decrease in Cash and Restricted Cash
Decrease in Cash and Restricted Cash
Cash and Restricted Cash, beginning of year
Cash and Restricted Cash, beginning of year
Cash and Restricted Cash, beginning of year
Cash and Restricted Cash, end of year
Cash and Restricted Cash, end of year
Cash and Restricted Cash, end of year
Supplemental disclosure of cash flow information:
Supplemental disclosure of cash flow information:
Supplemental disclosure of cash flow information:
Cash paid for interest
Cash paid for interest
Cash paid for interest
Cash (received) paid for income taxes
Cash (received) paid for income taxes
Cash (received) paid for income taxes
Supplemental disclosure of non-cash investing and financing activities:
Supplemental disclosure of non-cash investing and financing activities:
Supplemental disclosure of non-cash investing and financing activities:
Equity issued as consideration for acquisition of business
Equity issued as consideration for acquisition of business
Equity issued as consideration for acquisition of business
Change in accrued purchases for property and equipment
Change in accrued purchases for property and equipment
Change in accrued purchases for property and equipment
Paid-in-kind dividend on Series A Preferred Stock
Paid-in-kind dividend on Series A Preferred Stock
Paid-in-kind dividend on Series A Preferred Stock
Acquisition of property and equipment under finance lease
Acquisition of property and equipment under finance lease
Acquisition of property and equipment under finance lease

See Notes to the Consolidated Financial Statements.

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

Note 1 - Summary of Operations and Significant Accounting Policies

Nature of Operations

Arq Inc. ("Arq" or the "Company", formerly known as Advanced Emissions Solutions, Inc. ("ADES" or the "Company")) is a Delaware corporation with its principal office located in Greenwood Village, Colorado, and manufacturing, mining and logistic operations located in Louisiana. Louisiana and mining and manufacturing operations in Kentucky.

The Company is an environmental technology company and is principally engaged in the sale of consumable air, water, and water soil treatment options solutions including activated carbon ("AC") and chemical technologies. The Company's proprietary technologies in the advanced purification technologies ("APT") market AC products enable customers to reduce air, water, and water soil contaminants, including mercury, per and polyfluoroalkyl substances ("PFAS") and other pollutants, to maximize utilization levels and to improve operating efficiencies to help our customers meet the challenges of existing and pending air quality and water regulations. The Company manufactures and sells AC and other chemicals used to capture and remove contaminants for coal-fired power generation, industrial, municipal water and air, water, and soil treatment markets. The Company also owns an associated lignite mine (the "Five Forks Mine") which supplies and remediation markets (collectively, the primary raw material for manufacturing AC, advanced purification technologies or "APT" market).

Through December 31, 2021, in February 2023, the Company generated substantial earnings from its acquired 100% of the equity ownership in Tinum Group, LLC ("Tinuum Group") of the subsidiaries of Arq Limited (the "Arq Acquisition," and hereafter the Arq Limited subsidiaries referred to as "Legacy Arq") to secure access to a feedstock, a manufacturing facility and Tinuum Services, LLC ("Tinuum Services"), both of which are unconsolidated entities. Both Tinuum Group and Tinuum Services ceased material operations effective December 31, 2021 certain patented processes as a result means to manufacture additional granular activated carbon ("GAC") products for sale into the APT and other markets. With the Arq Acquisition, the Company now controls bituminous coal waste reserves and owns a manufacturing facility, both located in Corbin Kentucky (the "Corbin Facility"), and a process to recover and purify the bituminous coal fines for sale or further conversion to GAC products. Under this manufacturing process, the Company expects to be able to convert bituminous coal waste into a purified, microfine carbon powder known as Arq powder™ ("Arq Powder"). See further discussion of the expiration of a tax credit program under Internal Revenue Code Section 45 - Production Tax Credit (the "Section 45 Tax Credit Program"). Tinuum Group provided reduction of mercury and nitrogen oxide ("NOx") emissions at select coal-fired power generators through the production and sale of refined coal ("RC") that qualified for tax credits under the Section 45 Tax Credit Program ("Section 45 tax credits"). The Company also earned royalties for technologies which were licensed to Tinuum Group and used at certain RC facilities to enhance combustion and reduce emissions of NOx and mercury from coal burned to generate electrical power. Tinuum Services operated and maintained the RC facilities under operating and maintenance agreements with Tinuum Group and owners or lessees of the RC facilities. Presently, both Tinuum Group and Tinuum Services continue to wind-down their operations. Arq Acquisition in Note 2.

Principles of Consolidation

The Consolidated Financial Statements include accounts of wholly-owned subsidiaries and variable interest entities ("VIEs") in which the Company is the primary beneficiary. All significant intercompany balances and transactions have been eliminated in consolidation.

All investments in partially owned entities for which the Company has the ability to exercise significant influence and holds a 20% or greater than 20% ownership are accounted for using the equity method interest based on the legal form of the Company's ownership percentage are accounted for using the equity method and are included in the Other long-term assets, net line item in the Consolidated Balance Sheets. As of December 31, 2022 December 31, 2023, the Company holds equity interests of 42.5% and 50.0% in Tinuum Group, LLC ("Tinuum Group") and Tinuum Services, LLC ("Tinuum Services"), respectively.

Cash and restricted cash

Cash consists of cash on hand and bank deposits. Restricted cash is primarily comprised of posted cash collateral required under a surety bond contract related to the Five a lignite mine in Louisiana (the "Five Forks Mine Mine") and the Company's mine located at Marshall, Texas. Corbin Facility.

Concentration of credit risk

As of December 31, 2022 December 31, 2023, the Company's financial instruments that are exposed to concentrations of credit risk consist primarily of cash and cash equivalents. The Company holds cash and cash equivalents that exceed the Federal Deposit Insurance Corporation ("FDIC") limits (currently \$250 thousand) at two financial institutions as of December 31, 2022. institutions. If those institutions were a financial institution was unable to perform their its obligations, the Company would be at risk regarding the amount of its cash balance held in excess of the federal deposit insurance corporation limits (\$250 thousand). FDIC limits.

Fair value measurements

The carrying amounts of our cash, restricted cash, accounts receivable, accounts payable and other current liabilities approximate fair value as recorded due to the short-term nature of these instruments.

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries **Notes to Consolidated Financial Statements**

Receivables, net

Receivables, net are recorded at net realizable value, which includes an appropriate allowance for estimated uncollectible amounts to reflect any loss anticipated on the receivables. Increases and decreases in the allowance for doubtful accounts are established based upon changes in the credit quality of receivables and are included as a component of the General and administrative line item in the Consolidated Statements of Operations. The allowance for doubtful accounts is based on historical experience, general economic conditions and the credit quality of specific accounts and was not material as of December 31, 2022 December 31, 2023 and 2021. 2022.

Inventories, net

The cost of inventory is determined using the average cost method. Inventories, net are stated at the lower of average cost or net realizable value and consist principally of raw materials and finished goods related to the Company's AC and chemical products. The cost of inventory is determined using the average cost method.

Inventories are periodically reviewed for both potential obsolescence and potential declines in anticipated selling prices. In this review, the The Company makes assumptions about the future demand for and market value of the inventory and estimates the amount of any obsolete, unmarketable, slow moving or overvalued inventory. If applicable, the Company will write down the value

The composition of inventories by an amount equal to the difference between the cost of the inventory and its estimated net realizable value.

Additional details regarding Inventory balances are Inventories is included in Note 5.3.

Intangible Assets

Intangible assets consist of patents, licensed technology, customer relationships, patents, and developed technologies and trade names. technology.

The Company has developed technologies resulting in patents being granted by the U.S. Patent and Trademark Office or other regulatory offices. Legal costs associated with securing the patent are capitalized and amortized over the legal or useful life beginning on the patent filing date.

The following table details the components of the Company's intangible assets:

		As of December 31,												As of	
		2022						2021						December	
														31,	
		2023												2023	
														2022	

method earnings in the period the distributions occur to the extent that the Company has not guaranteed any obligations of the investee or is not contractually required to provide additional funding to the investee. Subsequent earnings from investees where the Company has recognized earnings from distributions in excess of the carrying value of the equity method investment are recognized for the excess of cumulative earnings over previously recognized earnings from distributions. Additionally, when the Company's carrying value in an equity method investment is zero, and the Company has not guaranteed any obligations of the investee or is not required to provide additional funding to the investee, the Company will not recognize its share of any reported losses by the investee until future earnings are generated to offset previously unrecognized losses. Therefore, equity income (loss) reported in the Company's Consolidated Statements of Operations for certain equity method investees may differ from a mathematical calculation of net income or loss attributable to its equity interest based on the percentage ownership of the Company's equity interest and the net income or loss attributable to equity owners as shown in the investee's statements of operations.

Distributions from equity method investees are reported in the Consolidated Statements of Cash Flows as "return on investment" in Operating cash flows until such time as the carrying value in an equity method investee is reduced to zero. Thereafter, such distributions are reported as "distributions in excess of cumulative earnings" in Investing cash flows.

See Note 10 for additional information regarding the Company's equity method investments.

Investments in partially-owned subsidiaries for which the Company has less-than-20% less than 20% ownership are accounted for in accordance with accounting guidance applicable to equity investments that do not qualify for the equity method of accounting. The Company evaluates these types of investments for changes in fair value and, if there is change, recognizes the change in the Consolidated Statement of Operations. If no such events or changes in circumstances have occurred related to these types of investments, the fair value is estimated only if practicable to do so.

Property, Plant and Equipment

Property, plant and equipment are stated at cost less accumulated depreciation and includes include leasehold improvements. Depreciation on assets is computed using the straight-line method over the lesser of the estimated useful lives of the related assets or the lease term (ranging from 21 to 31 years). Maintenance and repairs that do not extend the useful life of the respective asset are charged to Operating operating expenses as incurred. When assets are retired, or otherwise disposed of, the property accounts are relieved of costs and accumulated depreciation and any resulting gain or loss is credited or charged to income. The Company performs an evaluation of periodically evaluates the recoverability of the carrying value of property, plant and equipment to determine if facts and circumstances indicate that their carrying values may be impaired. for impairment. Amortization of right of use assets under finance leased assets lease is included in depreciation expense and is calculated using the straight-line method over the term of the lease.

Leases

The Company records a right of use ("ROU") asset and related liability under a contract or part of a contract when it conveys the right to control the use of an identified asset for a period of time in exchange for consideration. Control over the use of an identified asset occurs when an entity has both the right to obtain substantially all of the economic benefits from the use of an identified asset and the right to direct the use of that identified asset. The determination of whether a contract contains a lease may require significant assumptions and judgments.

For all classes of underlying assets, the Company does not separate nonlease components from lease components and accounts for each separate lease component and the nonlease components associated with that lease component as a single lease component. The Company records lease liabilities and related ROU assets for all leases that have a term of greater than one year. For short-term leases (leases with terms of less than one year), the Company expenses lease payments on a straight-line basis over the lease term.

Advanced Emissions Solutions, Inc. and Subsidiaries **Notes to Consolidated Financial Statements**

Variable lease payments represent payments made by a lessee for the right to use an underlying asset that vary because of changes in facts or circumstances occurring after the commencement date of a lease other than the passage of time. Variable lease payments that are based on an index or rate, calculated by using the index or rate that exists on the lease commencement date, are included in the measurement of a lease liability. Certain of the Company's operating leases for office facilities contain variable lease components that are not based on an index or rate, and the Company recognizes these payments as variable lease expense in the period in which the obligation for those payments is incurred.

The Company calculates lease liabilities based on the present value of lease payments discounted by the rate implicit in the lease or, if not readily determinable, the Company's incremental borrowing rate.

Finance lease liabilities are subsequently measured by increasing the carrying amount to reflect interest expense on the finance lease liability and reducing the carrying amount of the lease liability to reflect lease payments made during the period. Interest

Arq, Inc. and Subsidiaries **Notes to Consolidated Financial Statements**

on finance lease liabilities is determined in each period during the lease term as the amount that produces a constant periodic discount rate on the remaining balance of the lease liability. ROU assets under finance leases are amortized over the remaining lease term on a straight-line basis. Interest expense related to finance lease liabilities and amortization of ROU assets under finance leases are included in the "Interest expense" and "Depreciation, amortization, depletion and accretion" line items, respectively, in the Consolidated Statements of Operations.

Operating lease liabilities are subsequently measured at the present value of the lease payments not yet paid, discounted using the discount rate for the lease established at the inception date of the lease. ROU assets under operating leases are subsequently measured at the amounts of the related operating lease liability, adjusted for, as applicable, prepaid or accrued lease payments, the remaining balance of any lease incentives received, unamortized initial direct costs and impairment. Lease expense from operating leases is recognized as a single lease cost over the remaining lease term on a straight-line basis. Variable lease payments not included in operating lease liabilities are recognized as expense in the period in which the obligation for those payments is incurred. Lease expense from operating leases is included in the "General and administrative" and "Consumables Cost of revenues, revenue, excluding depreciation and amortization" line items in the Consolidated Statements of Operations.

Other Assets

Mine Development Costs

Mine development costs are related to the Five Forks Mine and are stated at cost less accumulated depletion and include acquisition costs, the cost of other development work and mitigation costs. Costs are amortized over the estimated life of the related mine reserves, which as of **December 31, 2022** **December 31, 2023** is estimated to be **12** **14** years. The Company performs an evaluation of the recoverability of the carrying value of mine development costs to determine if facts and circumstances indicate that their carrying value may be impaired and if any adjustment is warranted. Mine development costs are reported in the "Other long-term assets, net" line item in the Consolidated Balance Sheets.

Spare Parts

Spare parts include critical spares required to support plant operations. Parts and supply costs are determined using the lower of cost or estimated replacement cost. Parts are recorded as maintenance expenses or capitalized in the period in which they are consumed or put into use. Spare parts are reported in the "Other long-term assets, net" line item in the Consolidated Balance Sheets.

Revenue Recognition

The Company recognizes revenue from a contract with a customer when a performance obligation under the terms of a contract with a customer is satisfied, which is when the customer controls the promised goods or services that are transferred in satisfaction of the performance obligation. Revenue is measured as the amount of consideration that is expected to be received in exchange for transferring goods or providing services, and the transaction price is generally fixed and generally does not contain variable or noncash consideration. In addition, the Company's contracts with customers generally do not contain customer refund or return provisions or other similar obligations. Transfer of control and satisfaction of performance obligations are further discussed **in each of the revenue components listed below.**

The Company uses estimates and judgments in determining the nature and timing of satisfaction of performance obligations, the standalone selling price ("SSP") of performance obligations and the allocation of the transaction price to multiple performance obligations, if any.

The Company's revenue component is **Consumables sales, but for 2021 also included License royalties. Consumables.**

Advanced Emissions Solutions, Inc. and Subsidiaries Notes to Consolidated Financial Statements

Consumables

The Company is principally engaged in the sale of consumable products that utilize AC and chemical-based technologies to a broad range of customers, including coal-fired utilities, **industrial and** water treatment plants, and other diverse markets. **The Company's proprietary technologies and associated product offerings provide purification solutions to enable our customers to reduce certain contaminants and pollutants and thus maximize utilization levels and improve operating efficiencies to meet the challenges of existing and potential regulations.**

The sale of consumable products is comprised of a single performance obligation and is recognized at the point in time when control transfers and the Company's obligation has been fulfilled, which is when the product is shipped or delivered to a customer. Performance obligations for the sale of consumable products do not extend beyond one year.

Arq, Inc. and Subsidiaries Notes to Consolidated Financial Statements

Certain contracts with customers require the customers to purchase minimum quantities over the contractual period ("MQ Contracts"). Under these MQ Contracts, the Company reserves the right to bill a customer for any shortfall in the actual quantity purchases and minimum quantity purchases as of the end of the contractual period. The Company recognizes revenue on MQ Contracts based on the satisfaction of all three of the following criteria: (1) the likelihood of a customer not meeting its MQ contract obligations is probable, (2) the amount of the shortfall can be quantified and (3) the Company elects to exercise its right to enforce the billing of the shortfall at some point during the contractual period through a billing subsequent to the contractual period. The determination of when all three criteria are satisfied requires significant judgment.

The Company performs shipping and handling activities through the use of third-party shippers and such activities occur prior to a customer obtaining control of goods. As such, the Company accounts for these activities as fulfillment activities and not as separate performance obligations. Shipping and handling costs incurred by the Company in delivering products to customers are billed to customers and are included in the transaction price and included in the **"Revenues" "Revenue - Consumables"** line item in the Consolidated Statements of Operations. Costs for shipping and handling activities incurred by the Company are included in the **"Consumables Cost" cost of revenues, revenue,** excluding depreciation and amortization" line item in the Consolidated Statements **of Operations.**

License royalties earned from Tinnuum Group

Through December 2021, the Company generated revenues from royalties ("M-45 Royalties") earned under a licensing arrangement ("M-45 License") of its M-45™ and M-45-PC™ emissions control technologies ("M-45 Technology") between the Company and Tinnuum Group, a related party. The Company recognized M-45 Royalties at a point in time based on the use of the M-45 Technology at certain RC facilities (the "M-45 Facilities") or through Tinnuum Group's use of licensed technology for rates in excess of amounts allowed for RC application. The amount of M-45 Royalties recognized was generally based on a percentage of pre-tax margins (as defined in the M-45 License) of the M-45 Facilities.

License royalties payable to Tinnuum Group

In December 2022, the Company and Tinnuum Group entered into an agreement (the "Tinnuum Group Royalty Agreement") whereby the Company pays Tinnuum Group a royalty (the "Tinnuum Group Royalty") for certain of the Company's sales of its M-Prove™ products after the expiration of the Section 45 Tax Credit Program (beginning January 1, 2022) to certain of the M-45 Facilities. The Tinnuum Group Royalty is calculated based on "Net Profit" (as defined in the Tinnuum Royalty Agreement) on the Company's sales of M-Prove™ product to certain of the M-45 Facilities. The Tinnuum Group Royalty Agreement is for an initial term of five years with automatic renewals of five years unless the Company and Tinnuum Group agree to terminate it.

For the year ended December 31, 2022, the Company recognized \$0.8 million of Tinnuum Group Royalties, which are included in the "Consumables cost of revenues, excluding depreciation and amortization" line item in the Consolidated Statement of Operations.

Practical Expedients and Exemptions

The Company does not disclose the value of unsatisfied performance obligations for contracts with an original expected length of one year or less.

Sales and other taxes that are collected concurrently with revenue-producing activities are excluded from revenue.

The Company generally expenses sales commissions when incurred, as the amortization period of the asset that the Company would have recognized is one year or less. These costs are recorded in sales and marketing expenses in the "General and administrative" line item in the Consolidated Statements of Operations.

Consumables Cost of Revenues Revenue

Consumables cost of revenues revenue includes all labor, fringe benefits, subcontract labor, additive and coal costs, materials, equipment, supplies, travel costs and any other costs and expenses directly related to the Company's production of revenues. revenue.

License Royalties Payable to Tinnuum Group

In December 2022, the Company and Tinnuum Group entered into an agreement (the "Tinnuum Group Royalty Agreement") whereby the Company agreed to pay Tinnuum Group a royalty (the "Tinnuum Group Royalty") on sales of M-Prove™ to certain power plants where Tinnuum Group had operated refined coal facilities (the "M-45 Facilities") prior to the expiration of the Section 45 Tax Credit Program on December 31, 2021. Amounts due under the Tinnuum Group Royalty Agreement commenced on January 1, 2022. The Tinnuum Group Royalty is calculated based on "Net Profit" (as defined in the Tinnuum Royalty Agreement) on the Company's sales of M-Prove™ product to the M-45 Facilities. The Tinnuum Group Royalty Agreement is for an initial term of five years with automatic renewals of five years unless the Company and Tinnuum Group agree to terminate it. The Tinnuum Group Royalty is included in Cost of revenue in the Consolidated Statements of Operations.

Payroll and Benefits

Payroll and benefits costs include payroll costs, payroll related fringe benefits and stock based compensation expense of research and development, sales and administrative personnel, but exclude such costs related to direct labor that are included in Cost of revenue.

Payroll and benefits costs include direct payroll, personnel related fringe benefits, sales and administrative staff labor costs and stock compensation expense. Payroll and benefits costs exclude direct labor included in Cost of revenues.

Advanced Emissions Solutions, Inc. and Subsidiaries

Notes to Consolidated Financial Statements

revenue.

Legal and Professional

Legal and professional costs include external legal, audit and consulting expenses.

General and Administrative

General and administrative costs include director fees and expenses, rent, insurance and occupancy-related expenses, bad debt expense, impairments, research and development and other general costs of conducting business.

Arq, Inc. and Subsidiaries

Notes to Consolidated Financial Statements

Research and Development

Research and development costs are charged to expense in the period incurred and are reported in within the "Payroll and Benefits" and "General and administrative" line item items in the Consolidated Statements of Operations. For the years ended December 31, 2022 December 31, 2023 and 2021, 2022, the Company recorded total research and development costs of \$0.4 million \$3.3 million and \$0.4 million \$2.1 million, respectively.

Asset Retirement Obligations

Asset retirement obligations ("ARO") are comprised of mine reclamation activities required under operating agreements related primarily to the Five Forks Mine and Marshall Mine (as defined below) a coal waste site adjacent to the Corbin Facility (the "Corbin ARO") and are recognized when incurred and recorded as liabilities at fair value. An ARO is accreted over time through periodic charges to earnings. An ARO asset is depreciated over its estimated remaining life. Accounting for AROs requires the Company to make estimates of estimate future costs unique to a specific mining operation that the Company expects to incur to complete the reclamation and remediation work required to comply with existing laws and regulations. AROs are periodically adjusted to reflect changes in the estimated present value resulting from the passage of time and revisions to the estimates of either the timing or amount of the reclamation costs.

Five Forks Mine

For the Five Forks Mine ARO, a corresponding ARO asset is depreciated over its estimated life. Reclamation costs related to the Five Forks Mine are allocated to expense over the life of the related mine assets, and are periodically adjusted to reflect changes in the estimated present value resulting from the passage of time and revisions to the estimates of either the timing or amount of the reclamation costs. Remediation costs for the Five Forks Mine are accrued based on management's best estimate at the end of each period of the costs expected to be incurred. Such cost estimates may include ongoing care, maintenance and monitoring costs. Reclamation obligations are based on the timing of estimated spending for an existing environmental disturbance. On an annual basis, unless otherwise deemed necessary, the Company reviews its estimates and assumptions of the Five Forks Mine ARO.

The Company's mining activities at the Five Forks Mine are subject to various domestic laws and regulations governing the protection of the environment. The Company conducts its mining activities to protect public health and the environment and believes its operations are in compliance with applicable laws and regulations in all material respects. The Company has made, and expects to make in the future, expenditures to comply with such laws and regulations, but cannot predict the full amount of such future expenditures. Estimated future reclamation costs are based principally on current legal and regulatory requirements.

Marshall Mine (refer to Note 3)

Reclamation costs related to the Marshall Mine are largely based on a capped fee structure based on the initial estimate of the total costs of reclamation, which provides for certain contingencies that could increase or decrease the reclamation fee based on the reclamation agreement executed between the Company and the operator of the Marshall Mine. The timing of payments and actual reclamation costs may change and the Company accounts for these changes on a quarterly basis. AROs.

Income Taxes

The Company accounts for income taxes under the asset and liability method, which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements. Under this method, deferred income taxes are provided for temporary differences between the financial reporting basis and tax basis of the Company's assets and liabilities and are tax-effected using enacted tax rates in effect for the year in which the temporary differences are expected to reverse. The effect of a change in tax rates on deferred tax assets and liabilities is recognized in operations in the period that includes the enactment date.

The Company maintains valuation allowances where it is more likely than not that all or a portion of deferred tax assets will not be realized. In making such a determination, the Company considers all available positive and negative evidence, including future reversals of existing taxable temporary differences, projected future taxable income, tax-planning strategies, and results of recent operations.

Advanced Emissions Solutions, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

The Company records uncertain tax positions on the basis of a two-step process whereby (1) the Company determines whether it is more-likely-than-not that the tax positions will be sustained on the basis of the technical merits of the position and (2) for those tax positions that meet the more-likely-than-not recognition threshold, the Company recognizes the amount of tax benefit that is more than 50 percent likely to be realized upon ultimate settlement with the related tax authority.

Stock-Based Compensation

Stock-based compensation expense is measured at the grant date based on the estimated fair value of the stock-based award and is generally expensed on a straight-line basis over the requisite service period and/or performance period of the award. Forfeitures are recognized when incurred. Stock-based compensation expense related to manufacturing employees and administrative employees is included in the "Consumables Cost of revenues, revenue, exclusive of depreciation and amortization" and "Payroll and benefits" line items, respectively, in the Consolidated Statements of Operations. Stock-based compensation expense related to non-employee directors and consultants is included in the "General and administrative" line item in the Consolidated Statements of Operations.

Dividends

When a sufficient amount of available earnings exists at the time of a dividend declaration, dividends are charged to Retained earnings when declared. If a sufficient amount of available earnings is not available, dividends declared are charged as a reduction to Additional paid-in capital.

Earnings (Loss) Per Share

Basic earnings (loss) per share is computed using the weighted-average number of shares of common stock outstanding during the reporting period. Diluted earnings per share is computed in a manner consistent with that of basic earnings per share, while considering other potentially dilutive securities. The treasury stock method is used to determine the dilutive effect of potentially dilutive securities.

Arq, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

Potentially dilutive securities consist of restricted stock awards ("RSAs") and contingent performance stock units ("PSUs") (collectively, "Potential dilutive shares"). Potential dilutive shares are excluded from diluted earnings (loss) per share when their effect is anti-dilutive. When there is a net loss for a period, all Potential dilutive shares are anti-dilutive and are excluded from the calculation of diluted loss per share for that period.

Each PSU represents a contingent right to receive shares of the Company's common stock, and the number of shares may range from zero to two times the number of PSUs granted on the award date depending upon the price performance of the Company's common stock as measured against a general index and a specific peer group index over requisite performance periods. The number of Potential dilutive shares related to a PSU is based on the number of shares of the Company's common stock, if any, that would be issuable at the end of the respective reporting period, assuming that the end of the reporting period is the end of the contingency period applicable to a PSU. See Note 12 for additional information related to PSUs.

The following table sets forth the calculations of basic and diluted earnings (loss) per common share:

		Years Ended December 31,	
(in thousands, except per share amounts)	(in thousands, except per share amounts)	2022	2021
Net (loss) income		\$ (8,917)	\$ 60,401
(in thousands, except per share amounts)			
(in thousands, except per share amounts)			

Net loss			
Net loss			
Net loss			
Basic weighted-average number of common shares outstanding			
Basic weighted-average number of common shares outstanding			
Basic weighted-average number of common shares outstanding	Basic weighted-average number of common shares outstanding	18,453	18,258
Add: dilutive effect of equity instruments	Add: dilutive effect of equity instruments	—	203
Add: dilutive effect of equity instruments			
Add: dilutive effect of equity instruments			
Diluted weighted-average shares outstanding	Diluted weighted-average shares outstanding	18,453	18,461
(Loss) earnings per share - basic	\$	(0.48)	\$ 3.31
(Loss) earnings per share - diluted	\$	(0.48)	\$ 3.27
Diluted weighted-average shares outstanding			
Diluted weighted-average shares outstanding			
Loss per share - basic			
Loss per share - basic			
Loss per share - basic			
Loss per share - diluted			
Loss per share - diluted			
Loss per share - diluted			

For the years ended **December 31, 2022** **December 31, 2023** and **2021**, **0.6** **2022**, **1.7** million and **zero** **0.6** million weighted-average equity instruments, respectively, were outstanding but were not included in the computation of diluted earnings per share because their effect would have been anti-dilutive.

Advanced Emissions Solutions, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

Use of Estimates

The preparation of the Company's consolidated financial statements in conformity with accounting principles generally accepted in the United States ("GAAP") requires the Company's management to make estimates and assumptions that affect the amounts reported in these financial statements and accompanying notes. Actual results could differ from those estimates. Significant financial statement components in which the Company makes assumptions include:

- business combinations, including asset acquisitions;
- the carrying value of its long-lived assets;
- AROs; and
- income taxes, including the valuation allowance for deferred tax assets and assessment of uncertain tax positions.

Risks and Uncertainties

The Company is principally dependent on operations of its APT business and its cash on hand to provide liquidity over the near and long term. The Company's **revenues**, **revenue**, sales volumes, earnings and cash flows are significantly affected by prices of competing power generation sources such as natural gas and renewable energy. During periods of low natural gas prices, natural gas provides a competitive alternative to coal-fired power generation and therefore, coal consumption may be reduced, which in turn reduces the demand for the Company's products. However, during periods of higher prices for competing power generation sources, there is generally an increase in coal consumption and thus demand for the Company's products also increases.

In addition, coal consumption and demand for the Company's products are affected by the demand for electricity, which is higher in the warmer and colder months of the year. As a result, the Company's operating results are subject to seasonal variations whereby its **revenues** **revenue** and cost of **revenues** **revenue** tend to be higher in its first and third fiscal quarters compared to its second and fourth fiscal quarters. Abnormal temperatures during the summer and winter months may significantly affect coal

Arq, Inc. and Subsidiaries

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consumption and impurities within various municipalities' water sources, and thus impact the demand for the Company's products.

Reclassifications

Certain balances have been reclassified from prior years to conform to the current year presentation. Such reclassifications had no effect on the Company's results of operations or financial position in any of the periods presented.

Segments

Operating segments are defined as components of an enterprise about which separate financial information is available that is evaluated regularly by a company's chief operating decision maker ("CODM"), or a decision-making group, in deciding how to allocate resources and in assessing financial performance. As of **December 31, 2022** **December 31, 2023**, the Company's CODM was the

Company's Chief Executive Officer, and the Company concluded that it had one reportable segment. **Given the wind-down of Tinnu Group and Tinnu Services and the impact on the Company's financial statements, including the method in which the CODM allocates resources, the Company determined the historical Refined Coal segment no longer met the qualitative or quantitative criteria to be considered a reporting segment under GAAP. As a result, beginning January 1, 2022**

New Accounting Standards

Recently Adopted

Effective January 1, 2023, the Company **determined that it had one reportable segment and therefore has not provided segment reporting disclosures for both 2022 and 2021.**

New Accounting Guidance

In June 2016, the FASB issued adopted ASU 2016-13, Financial Instruments - Credit Losses (Topic 326) Measurement of Credit Losses on Financial Instruments ("ASU 2016-13"). The main objective of ASU 2016-13 is to provide financial statement users with more decision-useful information about the expected credit losses on financial instruments and other commitments to extend credit held by a reporting entity at each reporting date. To achieve this objective, the amendments in The adoption of ASU 2016-13 replace the incurred loss impairment methodology in current GAAP with a methodology that reflects expected credit losses and requires consideration of a broader range of reasonable and supportable information to inform credit loss estimates. ASU 2016-13 is effective for "smaller reporting companies" (as defined by the Securities and Exchange Commission) for fiscal years beginning after December 15, 2022, including interim periods within those years, and must be adopted under a modified retrospective method approach. Entities may adopt ASU 2016-13 earlier as of the fiscal years beginning after December 15, 2018, including

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interim periods within those years. The Company will adopt ASU 2016-13 effective January 1, 2023 and this standard will did not have a material impact on the Company's financial statements and disclosures.

Recently Issued

In December 2023, the FASB issued Accounting Standards Update 2023-09, Income Taxes (Topic 740): Improvements to Income Tax Disclosures. ("ASU 2023-09"). ASU 2023-09 requires entities to disclose: (1) consistent categories and greater disaggregation of information in the rate reconciliation and (2) the disaggregation of income taxes paid by jurisdiction. This update also makes several other changes to the income tax disclosure requirements. For public entities, the amendments in ASU 2023-09 are effective for fiscal years beginning after December 15, 2024, with early adoption permitted, and is required to be applied prospectively, but retrospective application is permitted. The Company is currently evaluating the impact of ASU 2023-09 on its income tax disclosures.

Note 2 - Customer Supply Agreement Arg Acquisition

On September 30, 2020, the Company and Norit Activated Carbon - Americas (f/k/a Cabot Norit Americas, Inc.) ("Norit") entered into a supply agreement February 1, 2023 (the "Supply Agreement" "Acquisition Date") pursuant to which the Company agreed to sell and deliver to Norit, and Norit agreed to purchase and accept from the Company certain lignite-based AC products ("Furnace Products"). The term of the Supply Agreement is for 15 years with 10-year renewal terms that are automatic unless either party provides three years prior notice of intention not to renew before the end of any term.

Under the Supply Agreement, Norit also reimburses the Company for certain capital expenditures incurred by the Company that are necessary to manufacture the Furnace Products. Reimbursements are comprised of revenues earned from capital expenditures incurred that will benefit both the Company and Norit (referred to as "Shared Capital") and revenues earned from capital expenditures incurred that will benefit Norit exclusively (referred to as "Specific Capital"). In the event that Norit ceases to make purchases under the Supply Agreement, Norit is obligated to pay the balance of any outstanding payments for Specific Capital.

Further, under the terms of the Supply Agreement, Norit was obligated to pay the Reclamation Reimbursement (defined in Note 3 below) to the Company for \$10.2 million of the Reclamation Costs (defined in Note 3 below), inclusive of interest.

On February 25, 2022, the Company received \$10.6 million in cash from Norit (the "Norit Payment") as a result of a change in control provision in the Supply Agreement (the "Change in Control"), which occurred as a result of the sale of Norit by its parent, Cabot Corporation. Under the Change in Control, the Company received from Norit full payment of all amounts outstanding under the Reclamation Reimbursement, payment of all unbilled amounts related to Specific Capital for expenditures incurred through February 28, 2022 and payment of \$0.8 million related to additional costs due to the third-party operator of Marshall Mine (the "Norit Reclamation Costs"). Under the Reclamation Contract (defined in Note 3 below), the Company was obligated to remit payment for the Norit Reclamation Costs to the third-party operator of Marshall Mine (defined in Note 3 below), and such payment was remitted in March 2022. The Change in Control did not impact any other provisions of the Supply Agreement.

As of February 25, 2022, the carrying value of the Reclamation Reimbursement was \$9.0 million, which included the principal balance, adjusted for accretion of interest and payments made to date. Under the Change in Control, the Company received \$8.5 million in cash for full payment of the outstanding Reclamation Reimbursement. The Company

concluded that the cash proceeds received represented an early payment of a receivable based on a change in contractual terms and accounted for the difference between the cash proceeds received and the carrying amount of the Reclamation Reimbursement of \$0.5 million as a loss, which is included in the "Other income (expense)" line item in the Consolidated Statement of Operations for the year ended December 31, 2022.

Also, under the Change in Control, the Company received \$1.3 million in advance of revenue to be recognized in future periods related to Specific Capital and recorded this amount as deferred revenue, which is recognized ratably over the remaining contractual term as stipulated in the Supply Agreement.

Note 3 - Marshall Mine

Acquisition

Concurrently with the execution of the Supply Agreement, on September 30, 2020, the Company entered into an a securities purchase agreement to purchase from Norit 100% (the "Purchase Agreement") with Arq Ltd. for the Arq Acquisition in exchange for consideration (the "Purchase Consideration") totaling \$31.2 million and consisting of (i) 3,814,864 shares of the membership interests in Marshall Mine, LLC Company's common stock, par value \$0.001 per share (the "Marshall Mine Acquisition" "Common Stock") for a nominal purchase price. Marshall Mine, LLC owns a lignite mine located outside , valued at \$12.4 million based on the closing price of Marshall, Texas the Common Stock on the Acquisition Date and (ii) 5,294,462 shares of the Company's Series A Convertible Preferred Stock, par value \$0.001 per share (the "Marshall Mine" "Series A Preferred Stock" or the "Preferred Shares"), valued at \$18.8 million. The Company concluded that also incurred \$8.7 million in acquisition-related costs, which have been expensed as incurred.

Legacy Arq's principal location is in Corbin, Kentucky where it operates the Marshall Mine did not have any remaining economic reserves Corbin Facility, which processes bituminous coal waste into Arq Powder and independently determined can be used as an alternative to immediately commence activities oil or in-ground mined coal to shutter it. Accordingly, on September 30, 2020, produce a range of carbon products. With the completion of the Arq Acquisition, the Company intends to sell Arq Powder as a feedstock to produce high-quality AC for use in water and air purification markets. The Company expects to begin using Arq Powder to produce granular activated carbon products by the end of 2024.

The Company accounted for the Arq Acquisition as an acquisition of a third party entered into a reclamation contract (the "Reclamation Contract") for full reclamation business. The total Purchase Consideration was \$31.2 million and was allocated to the acquired assets and assumed liabilities of Legacy Arq based on their estimated fair values as of the Marshall Mine, which Acquisition Date. The Purchase Consideration was expected to be completed by 2030. Under the terms comprised of the Supply Agreement, Norit was obligated to reimburse the Company for \$10.2 million (the "Reclamation Reimbursement") for a portion fair values as of the total Acquisition Date of 3,814,864 shares of Common Stock, valued at \$12.4 million, and 5,294,462 Preferred Shares, valued at \$18.8 million. The Company also incurred \$8.7 million in acquisition-related costs, which were expensed as incurred under and included in the Reclamation Contract (the "Reclamation Costs"), which was payable semi-annually over 13 years "General and inclusive administrative" and "Legal and professional fees" line items in the Statements of interest. As discussed in Note 2, on February 25, 2022 as part of the Change in Control, Norit fully paid the outstanding amount owed under the Reclamation Reimbursement and has no further liability related to the Marshall Mine. Operations.

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The Company accounted for following table provides the Marshall Mine Acquisition as an asset acquisition, and it included final purchase price allocation to the acquisition of certain assets and assumption of certain liabilities as well as the incurrence of an obligation for the Reclamation Costs (the "Marshall Mine ARO"). As of December 31, 2022 and 2021, the carrying value of the Marshall Mine ARO was \$4.7 million and \$6.3 million, respectively.

As the Marshall Mine Acquisition represented a transaction with a customer of net assets acquired and liabilities assumed from Norit, as of the date of the Arq Acquisition:

(in thousands)	Purchase Price Allocation
Fair value of assets acquired:	
Cash	\$ 1,411
Prepaid expenses and other current assets	2,229
Restricted cash, long-term	814
Property, plant and equipment, net	39,159
Other long-term assets, net	11,717
Amount attributable to assets acquired	55,330
Fair Value of liabilities assumed:	
Accounts payable and accrued expenses	9,806
Current portion of long-term debt	494
Other current liabilities	103
Long-term debt, net of current portion	9,199
Other long-term liabilities	4,523
Amount attributable to liabilities assumed	24,125
Net assets acquired	\$ 31,205

The following represents the intangible asset identified as part of the Arq Acquisition and which is included in "Other long-term-assets, net" in the table above:

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(in thousands)	Weighted Average Useful Life	
	Amount	(years)
Developed technology	\$ 7,700	20

Series A Preferred Stock

In connection with the issuance of the Series A Preferred Stock pursuant to the Purchase Agreement, the Company accounted filed the Certificate of Designations of Preferred Stock for the excess Series A Preferred Stock (the "Certificate of Designations") with the Secretary of State of the fair value State of liabilities assumed over assets acquired Delaware. Under the Certificate of Designations, 8.9 million preferred shares were designated as upfront consideration transferred Series A Preferred Stock.

On June 13, 2023 (the "Conversion Date"), the Company's stockholders approved the conversion of all of the outstanding shares of Series A Preferred Stock, including the "Escrow Shares," as defined below, and the corresponding issuance of shares of Common Stock. Upon such approval, each outstanding share of Series A Preferred Stock was automatically converted into the number of shares of Common Stock described below. Each share of Series A Preferred Stock was deemed to a customer, Norit have an original issue price of \$4.00 per share (the "Upfront Customer Consideration" "Original Issue Amount"), which. The number of shares of Common Stock issued upon conversion of each share of Series A Preferred Stock was \$7.6 million. The equal to the product of (i) the sum of (A) the Original Issue Amount plus (B) an amount equal to the cumulative amount of the Upfront Customer Consideration was also recognized net accrued and unpaid dividends on such share at such time divided by (ii) the Original Issue Amount, subject to adjustment.

Holders of the Reclamation Reimbursement. The total Upfront Customer Consideration Series A Preferred Stock were entitled to receive cumulative dividends, which accrued quarterly on the last day of each applicable quarter (whether or not declared or funds for their payment are lawfully available) and were payable quarterly, in arrears, on the earlier to occur of (a) the date any dividend is being amortized as a reduction paid to revenues on a straight-line basis over the expected 15-year contractual period holders of the Supply Agreement. Amortization of the Upfront Customer Consideration is approximately \$0.5 million per year.

As of June 30, 2021 and December 31, 2021, the Company significantly revised its estimate of future obligations owed for the reclamation of the Marshall Mine primarily based on scope reductions related to future reclamation requirements. As a result, the Company reduced the Marshall Mine ARO by \$1.9 million as of June 30, 2021 and \$0.8 million as of December 31, 2021 and for the year ended December 31, 2021 recognized a gain on change in estimate of \$2.7 million. This is included as "Gain on change in estimate, asset retirement obligation" in the Consolidated Statement of Operations for the year ended December 31, 2021.

Disposition

On September 2, 2022, (the "Agreement Date"), the Company entered into a Membership Interest Purchase Agreement (the "MM Purchase Agreement") with a third party (the "MM Buyer") to sell all of its membership interests in Marshall Mine, LLC to the MM Buyer (the "MM Sale") in exchange for a cash payment to be made by the Company to the MM Buyer of approximately \$2.4 million (the "MM Purchase Price") and the assumption by the MM Buyer of certain liabilities of Marshall Mine, LLC. The MM Buyer previously operated the Marshall Mine on behalf of Marshall Mine, LLC and is currently performing reclamation under the Reclamation Contract.

The MM Purchase Price is subject to adjustments for certain events that may occur during the period from the Agreement Date and the Closing Date (as defined below) as follows: (1) increased or reduced as agreed upon by the Company and the MM Buyer (collectively, the "Parties"); (2) increased or decreased by income, proceeds, receipts and credits earned Common Stock with respect to such quarter and (b) 30 days after the assets and operations end of Marshall Mine, LLC between signing and closing each quarter (the "Series A Quarterly Dividend") at the rate per share of Series A Preferred Stock equal to the greater of (i) if the Company declared a cash dividend on the Common Stock with respect to such quarter, the amount of the MM Sale, (3) increased cash dividend that would be received by any amounts that are, or under US GAAP should a holder of Common Stock in which such share of Series A Preferred Stock would be accrued as liabilities of Marshall Mine LLC as of the closing of the MM Sale, as more fully described in the MM Purchase Agreement; and (4) decreased by agreed amounts which escalate depending convertible on the timing record date for such cash dividend and (ii) an annual rate (the "Rate") of closing if it occurs after January 1, 2023.

The obligations 8.0% of the Parties to close the MM Sale (the "Closing Date") is subject to certain events, including (1) obtaining the approval of the Railroad Commission of Texas (the "Commission") for an operating permit in the name of the MM Buyer or an affiliate of the MM Buyer; and (2) the MM Buyer replacing the Company's surety bond with a reclamation performance bond, letter of credit or other form of security to which the MM Buyer or an affiliate of the MM Buyer is the principal that is satisfactory to the Commission.

The MM Purchase Agreement may be terminated: (1) by mutual consent of the MM Buyer and the Company at any time prior to the Closing Date; (2) by the MM Buyer or the Company, if the Closing has not occurred within one year after the Agreement Date, unless the failure of the consummation of the Closing shall be due to the failure of the party wishing to terminate to comply in all material aspects with the agreements and covenants contained therein; (3) if there is a material breach (by either the MM Buyer or the Company) of any representation, warranty, covenant or agreement contained in the MM Purchase Agreement that is not cured within a specified time frame; and (4) if the MM Sale is prohibited by governmental authority in a final, non-appealable order or applicable law.

As of December 31, 2022, Marshall Mine, LLC had outstanding liabilities of approximately \$4.9 million, which the Company expects to be fully discharged upon payment of the MM Purchase Price. Because the Closing Date is uncertain, primarily due to a date uncertain for the Parties to receive approval of the MM Buyer's operating permit and surety bond by the Commission, the Company is unable to determine the accounting period in which it will recognize the MM Sale.

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the Original Issue Amount compounded quarterly with respect to such quarter.

On March 31, 2023, the Company declared a dividend of 68,464 Series A PIK Shares with respect to the accrued dividends on the Preferred Shares for the first quarter of 2023 (the "PIK Dividend"). The PIK Dividend was recorded at the estimated fair value of \$0.2 million as of March 31, 2023 and was paid on April 21, 2023.

Of the total Preferred Shares issued in the Arq Acquisition, 833,914 were held in escrow (the "Escrow Shares") based on a contingent redemption feature, (the "Contingent Redemption Feature," as defined below). The fair value of the Preferred Shares issued was determined to be \$3.46 per Preferred Share on the Acquisition Date (the "Preferred Share Price") plus the value of the Contingent Feature related to the Escrow Shares. The Escrow Shares were converted into shares of Common Stock on the Conversion Date and continue to be held in escrow (the "Escrow Common Shares").

The following tables summarize Escrow Common Shares are being withheld pending a determination by the assets IRS that no tax withholding is required on the Purchase Consideration issued to Arq Ltd. (the "Arq Ltd. Tax Liability"). The Company estimated the fair value of the potential Arq Ltd. Tax Liability at \$3.3 million. In the event that the IRS determines that no withholding is required by Arq Ltd. in connection with the Purchase Consideration received by Arq Ltd., all of the Escrow Common Shares will be released and liabilities delivered to Arq Ltd. In the event that the IRS determines that any amount of Marshall Mine, LLC withholding is required by Arq Ltd., the Company has agreed to redeem a sufficient number of Escrow Common Shares to fund the required payment to the IRS, and their classification that number of Escrow Common Shares will be returned to the Company. The number of Escrow Common Shares to be returned to the Company is equal to the required withholding amount divided by the Original Issue Amount, not to exceed a maximum of 833,914 Escrow Common Shares, and is equal to \$3.3 million based on the Original Issue Amount (the "Maximum Contingent Redemption Amount"). The fair value of the Preferred Escrow Shares was determined on the Acquisition Date and was comprised of the Maximum Contingent Redemption Amount and the fair value of the non-escrowed Preferred Shares ("Non-Preferred Escrow Shares").

The Series A Preferred Stock contained a mandatory redemption feature in the Company's Consolidated Balance Sheets:

(in thousands)	As of December 31,		Balance sheet component
	2022	2021	
Cash	\$ —	\$ 914	Current assets
Norit receivable, short-term	—	2,056	Current assets
Restricted cash	10,000	10,027	Non-current assets
Norit receivable, long-term	—	6,846	Non-current assets
Property and equipment, net	—	1,968	Non-current assets
	<u>\$ 10,000</u>	<u>\$ 21,811</u>	
Accounts payable and accrued liabilities	\$ 201	\$ 1,065	Current liabilities
Asset retirement obligation, short-term	548	1,775	Current liabilities
Asset retirement obligation, long-term	4,131	4,546	Non-current liabilities
	<u>\$ 4,880</u>	<u>\$ 7,386</u>	

Note 4 - Revenues

For event the years ended December 31, 2022 and 2021, all material performance obligations related Preferred Shares, including future issuances of Series A Preferred Stock issued under dividend requirements, were not converted into shares of Common Stock prior to revenues recognized were satisfied at a point in time. For the years ended December 31, 2022 and 2021, approximately 8% and 12%, respectively, of Consumables revenues were generated in Canada, and all other revenues were generated in the U.S.

Trade receivables

Trade receivables represent an unconditional right to consideration in exchange for goods or services transferred to a customer. February 1, 2028. The Company invoices its customers in accordance with concluded that both the terms Escrow Shares and the Non Escrow Shares did not meet the definition of mandatorily redeemable financial instruments as there was a substantive conversion feature, and were therefore not classified as liabilities. As both the Escrow Shares and Non Escrow Shares represented financial instruments that were redeemable for cash, SEC guidance mandates that preferred securities which are redeemable upon the occurrence of an event that is not solely within the control of the contract. Credit terms are generally net 30 - 45 days from the date issuer be classified outside of invoice. The timing between the satisfaction of performance obligations and when payment is due from the customer is generally not significant.

The following table shows the components of the Company's Receivables, net:

(in thousands)	As of December 31,	
	2022	2021
Trade receivables, net	\$ 13,789	\$ 10,476
Other receivables	75	—
Norit Receivable - current	—	2,146
Receivables, net	<u>\$ 13,864</u>	<u>\$ 12,622</u>

Contract liabilities

As discussed in Note 2, permanent equity as "temporary equity." Accordingly, the Company received \$1.3 million in advance of revenue to be recognized in future periods related to Specific Capital classified and recorded this amount reported the Series A Preferred Stock as deferred revenue in February 2022, which is recognized ratably over the remaining contractual term as stipulated in the Supply Agreement. As of December 31, 2022, total deferred revenue related to Specific Capital was \$1.0 million, of which the current portion is included in "Other current liabilities" temporary equity and the long-term portion is included in "Other long-term liabilities" in the Consolidated Balance Sheet. Sheet as of as of the Acquisition Date. On the Conversion Date, all shares of Series A Preferred Stock were converted into 5,362,926 shares of Common Stock, and the Company reclassified all of the Series A Preferred Stock to Common Stock as of June 30, 2023.

PIPE Investment

On February 1, 2023 and pursuant to the Arq Acquisition, the Company entered into Subscription Agreements with certain persons (the "Subscribers"), which included existing shareholders of Arq Ltd., three of which were appointed to the Company's Board of Directors (the "Board"), pursuant to which the Subscribers

subscribed for and purchased 3,842,315 shares of Common Stock for an aggregate purchase price of \$15.4 million and at a price per share of \$4.00 (such transaction, the "PIPE Investment").

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Unaudited Pro Forma Financial Information

The following represents the pro forma effects of the Arq Acquisition as if it had occurred on January 1, 2022. The pro forma net loss for each of the two years presented has been calculated after applying the Company's accounting policies in effect for those years. In addition, pro forma net loss includes: (1) for the years ended December 31, 2023 and 2022, increases in depreciation and amortization resulting from fair value adjustments to Property, plant, equipment of \$0.2 million and \$0.1 million, respectively; (2) for the years ended December 31, 2023 and 2022, increases in amortization resulting from fair value adjustments to Intangibles of \$0.1 million and \$0.4 million, respectively; (3) for the year ended December 31, 2023 and 2022, increases to interest expense for: (a) the issuance of the CFG Loan (as defined below) including stated interest and the amortization of the CFG Loan's discount and issuance costs and (b) amortization of debt discount related to a fair value adjustment to the assumed CTB Loan (as defined below) of Arq of \$0.2 million and \$2.0 million, respectively; (4) the removal of \$1.9 million of Payroll and benefits for compensation expense payable to certain Arq employees triggered by change in control provisions in employment agreements, as well as in employee severance agreements, for the year ended December 31, 2023 but included as additional Payroll and benefits expense for the year ended December 31, 2022; (5) for the years ended December 31, 2023 and 2022, decreases to general and administrative expenses resulting from fair value adjustments to operating leases acquired of \$0.1 million and \$0.5 million, respectively, and (6) for the year ended December 31, 2022, the addition of \$2.4 million of transaction costs incurred for the period from January 1, 2023 through the Arq Acquisition Date, together with the income tax effects on (1) through (6). Since Arq had no revenue for the years ended December 31, 2023 or 2022, pro forma revenue is the same as the Company's reported revenue for those years.

(in thousands)	Years ended December 31,	
	2023	2022
Revenue	\$ 99,183	\$ 102,987
Net loss	\$ (11,119)	\$ (75,788)

Other

The amounts of year to date revenue and net loss for Arq for the period from the Acquisition Date to December 31, 2023 are as follows:

(in thousands)	Year ended December 31,	
	2023	
Revenue	\$	—
Net loss	\$	(11,660)

Note 5 - Inventories, net

The following table summarizes the Company's inventories as of December 31, 2023 and 2022:

(in thousands)	As of December 31,	
	2023	2022
Product inventory	\$ 9,524	\$ 9,479
Raw material inventory	10,169	8,349
	<u>\$ 19,693</u>	<u>\$ 17,828</u>

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Note 4 - Property, Plant and Equipment

The cost basis and accumulated depreciation of property, plant and equipment at December 31, 2023 and 2022 are summarized in the table below:

(in thousands)	Life in Years	As of December 31,	
		2023	2022
Land and land improvements	5+1	\$ 1,225	\$ 1,225
Plant and operating equipment	3-29	81,266	33,180
Furniture and fixtures	1-19	1,765	1,709
Machinery and equipment	3-10	2,478	2,116

Leasehold improvements	12	2,149	2,149
Construction in progress		25,059	6,373
		113,942	46,752
Less accumulated depreciation		(19,293)	(11,897)
Total property, plant and equipment, net		\$ 94,649	\$ 34,855

1 Land Improvements have a useful life between 5 and 31 years.

Included in plant and operating equipment as of December 31, 2023 and 2022 is mining equipment financed under various lease facilities, and obligations due under these facilities are included in long-term debt in the Consolidated Balance Sheets. The total amount recorded for ROU assets as of December 31, 2023 and 2022 related to finance lease obligations was \$1.7 million and \$2.6 million, respectively, net of accumulated depreciation of \$2.7 million and \$2.0 million.

Depreciation expense for the years ended December 31, 2023 and 2022 was \$8.5 million and \$4.9 million, respectively.

Note 5 - Revenue

For the years ended December 31, 2023 and 2022, all material performance obligations related to revenue recognized were satisfied at a point in time. For each of the years ended December 31, 2023 and 2022, approximately 8%, respectively, of Consumables revenue was generated in Canada, and all other revenue was generated in the U.S.

In accordance with its revenue recognition policy for MQ Contracts, in December 2023, the Company exercised its right under certain MQ Contracts and recognized \$4.7 million of consumables revenue and recorded an unbilled receivable.

Trade receivables

Trade receivables represent an unconditional right to consideration in exchange for goods or services transferred to a customer. The Company invoices its customers in accordance with the terms of the contract. Credit terms are generally net 30 - 45 days from the date of invoice. The timing between the satisfaction of performance obligations and when payment is due from the customer is generally not significant.

Contract assets

Contract assets are comprised of unbilled receivables from customers and are included in Receivables, net in the Consolidated Balance Sheets. Unbilled receivables represent a conditional right to consideration in exchange for goods or services transferred to a customer.

The following table shows the components of the Company's Receivables, net:

(in thousands)	As of December 31,	
	2023	2022
Trade receivables, net	\$ 11,289	\$ 13,789
Unbilled receivables	4,862	—
Other	41	75
Receivables, net	\$ 16,192	\$ 13,864

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Contract liabilities

Contract liabilities are comprised of deferred revenue, which represents an obligation to transfer goods or services to a customer for which the Company has received consideration from the customer and, if deliverable within one year or less, is included in "Other current liabilities" in the Consolidated Balance Sheets and, if deliverable outside of one year, is included in "Other long-term liabilities" in the Consolidated Balance Sheets.

Note 6 - Debt Obligations

(in thousands)	As of	
	December 31, 2023	December 31, 2022
CFG Loan due February 2027, related party	\$ 10,000	\$ —
CTB Loan due January 2036	9,527	—
Finance lease obligations	3,465	4,581
	22,992	4,581
Unamortized debt discounts	(815)	—
Unamortized debt issuance costs	(1,250)	—
	20,927	4,581
Less: Current maturities	(2,653)	(1,131)
Total long-term debt obligations	\$ 18,274	\$ 3,450

CFG Term Loan

As required under the Purchase Agreement, and on February 1, 2023 (the "Closing Date"), the Company, as borrower, certain of its subsidiaries, as guarantors, and CF Global ("CFG"), a related party, as administrative agent and lender (the "Lender"), entered into a term loan (the "CFG Loan") in the amount of \$10.0 million, less original issue discount ("OID") of \$0.2 million, upon execution of a Term Loan and Security Agreement (the "CFG Loan Agreement"). The Company received net cash proceeds of \$8.5 million after deducting the OID and debt issuance costs of \$1.3 million.

The CFG Loan Agreement also required the issuance of a warrant (the "Warrant") to CFG to purchase 325,457 shares of Common Stock (the "Warrant Shares"), which represented 1% of the post-Arq Acquisition and PIPE Investment (as defined below) fully diluted share capital (as defined in the CFG Loan Agreement), at an exercise price of \$0.01 per share. The Warrant has a term of 7 years and contains a cashless exercise provision.

The Company allocated the cash proceeds of the CFG Loan Agreement to both the CFG Loan and the Warrant based on their relative fair values. The amount allocated to the Warrant was recorded as a debt discount and is amortized to interest expense over the term of the CFG Loan. The standalone fair value of the CFG Loan was based on a comparison of borrowings and associated credit ratings consistent with those of the Company. The Warrant is exercisable for \$0.01 per share, and the fair value is deemed to be equal to the fair value of the underlying shares. Accordingly, the fair value of the Warrant was determined as the number of shares issuable from the exercise of the Warrant (based on 1.0% of post-transaction fully diluted share capital, as defined in the Purchase Agreement) multiplied by the closing share price of the Company's common stock on the Acquisition Date.

The CFG Loan matures on February 1, 2027 and bears interest at a rate equal to either (a) Adjusted Term SOFR (subject to a 1.00% floor and a cap of 2.00%) plus a margin of 9.00% paid in cash and 5.00% paid in kind or (b) Base Rate plus a margin of 8.00% paid in cash and 5.00% paid in kind, which interest on the CFG Loan in each case shall be payable (or capitalized, in the case of in kind interest) quarterly in arrears.

The Company may prepay the CFG Loan at any time subject to the following prepayment premium: (i) prior to the twelve month anniversary of the Closing Date, the Make-Whole Amount (as defined below), (ii) thereafter but prior to the thirty-six month anniversary of the Closing Date, 2.00% of the outstanding principal amount of the CFG Loan being repaid or prepaid or (iii) thereafter until the maturity date, 1.00% of the outstanding principal amount of the CFG Loan being repaid or prepaid. The "Make-Whole Amount," with respect to any repayment or prepayment, is (i) an amount equal to all required interest payable (except for currently accrued and unpaid interest) on the aggregate principal amount of the CFG Loan subject to such

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prepayment or repayment from the date of such prepayment or repayment through but excluding the date that is the first anniversary of the Closing Date calculated using an interest rate equal to (x) Adjusted Term SOFR for an interest period of one month in effect on the third U.S. Government Securities Business Day prior to such prepayment or repayment plus (y) 14.00% per annum and assuming all interest was paid in cash, plus (ii) a prepayment premium of 2.00% on the aggregate principal amount of the CFG Loan subject to such prepayment or repayment.

The CFG Loan is secured by substantially all of the assets of the Company and its subsidiaries (including those acquired in the Arq Acquisition, but excluding those pledged as collateral (the "Arq Loan Assets") under the "CTB Loan," as defined and described below), subject to customary exceptions. The CFG Loan Agreement includes, among others, the following covenants: (1) beginning with the first fiscal quarter after March 31, 2023 and as of the end of each fiscal quarter thereafter, the Company must maintain a minimum unrestricted cash balance of \$5.0 million; (2) (x) as of December 31, 2023, for the fiscal year then ended, the Company must have a minimum annual revenue, on a consolidated basis, of \$70.0 million, (y) as of December 31, 2024, for the fiscal year then ended, the Company must have a minimum annual revenue, on a consolidated basis, of \$85.0 million and (z) for any fiscal year thereafter, the Company must have a minimum annual revenue, on a consolidated basis, of \$100.0 million; (3) (x) as of December 31, 2024, for the fiscal year then ended, the Company must have a minimum Consolidated EBITDA of \$3.0 million and (y) for any fiscal year thereafter, the Company must have a minimum Consolidated EBITDA of \$16.0 million; and (4) beginning after the fiscal quarter ending September 30, 2023, during an LTV Trigger Period, Arq must not exceed a loan to value ratio of 0.40:1.00 (based on the consolidated total assets of the Company and its subsidiaries, but excluding the Arq Loan Assets).

CTB Term Loan

As consideration in the Arq Acquisition, the Company assumed a term loan (the "CTB Loan") held by certain Arq subsidiaries, as borrowers, as set out in the Arq Loan (the "Arq Subsidiaries") held by Community Trust Bank ("CTB") in the principal amount of \$10.0 million. The Company recorded the CTB Loan on the Acquisition Date at its estimated fair value of \$9.7 million, with the difference of \$0.3 million between the estimated fair value and the principal amount recorded as a debt discount and recognized as interest expense over the term of the CTB Loan.

The CTB Loan was originally entered into on January 27, 2021 and is comprised of two promissory notes (the "Notes"): (1) "Note A" in the principal amount of \$8.0 million, which is guaranteed by the U.S. Department of Agriculture; and (2) "Note B" in the principal amount of \$2.0 million. The Notes mature on January 27, 2036 and bear interest at 6.0% per annum through January 2026 and at the lower prime rate plus 2.75% thereafter. Beginning January 27, 2023 and for the balance of average cost the term of the CTB Loan, the Arq Subsidiaries are required to make combined interest and principal payments monthly in the fixed amount of \$0.1 million. Interest is computed and payable on the outstanding principal as of the end of the prior month and the balance of the fixed monthly payment amount is applied to the outstanding principal. The Notes carry a prepayment penalty of 3.0% of the outstanding principal if paid prior to January 27, 2024, 2.0% of the outstanding principal if paid prior to January 27, 2025 and 1.0% of the outstanding principal if paid prior to January 27, 2026. Thereafter, the CTB Loan may be prepaid without penalty.

On June 2, 2023 (the "Amendment Date"), certain of the Arq Subsidiaries, which included Corbin Project LLC, Arq Projects Holding Company LLC, Arq St. Rose LLC, Arq Corbin LLC and Arq Corbin Land LLC (collectively, the "Borrowers") and CTB entered into a loan modification agreement (the "CTB Loan Modification Agreement") to the CTB Loan, as amended by that certain letter agreement by and among the CTB and Borrowers dated January 21, 2022, and as otherwise amended, modified and/or net realizable value extended by the parties from time to time (collectively, the "CTB Loan Agreement"). As consideration for CTB entering into the CTB Loan Modification Agreement, the Borrowers agreed to pay a fee of \$50,000 plus additional fees incurred by CTB and were required to deposit an additional \$0.7 million into a deposit account (the "Interest Reserve Account" as defined in the CTB Loan Agreement), where the Interest Reserve Account is held as collateral by CTB. The Borrowers may withdraw funds from the Interest Reserve Account beginning one year from the Amendment Date, subject to restrictions as stated in the CTB Loan Modification Agreement.

The CTB Loan Modification Agreement clarified and modified certain terms under the CTB Loan Agreement. The principal clarifications and modifications are as follows:

- The Borrowers are not entitled to any further disbursements of proceeds under those promissory notes described in the CTB Loan Modification Agreement;
- CTB agreed to waive certain financial delivery requirements for fiscal years 2021 and 2022;

Arq, Inc. and Subsidiaries
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- CTB agreed to waive certain required financial covenants required as of December 31, 2022 and 2021; certain required financial covenants as of December 31, 2023;

(in thousands)	As of December 31,	
	2022	2021
Product inventory	\$ 9,479	\$ 4,901
Raw material inventory	8,349	2,949
	<u>\$ 17,828</u>	<u>\$ 7,850</u>

- The Borrowers were required to establish their operating bank accounts with CTB no later than September 30, 2023; and
- CTB is authorized to amend and/or amend and restate its then-current security instruments to include additional collateral represented by the Borrowers' acquisition of any equipment or other fixed and/or operating assets in which CTB does not then hold a lien or security interest.

The CTB Loan is secured by substantially all assets of the Borrowers and includes among others, the following covenants with respect to the Borrowers, which are tested annually (Capitalized terms are defined in the CTB Loan Agreement): (a) Total Indebtedness to Net Worth greater than 4 to 1; (b) Balance Sheet Equity greater than or equal to 20% of the book value of all assets of the Borrowers; (c) (i) net income plus interest, taxes, depreciation and amortization divided by (ii) interest expense plus current maturities on long-term debt greater than or equal to 1.25 to 1.

The carrying value of our long-term debt under the CFG Loan and CTB Loan approximates its fair value because it bears interest at rates indexed to market rates.

Note 6 7 - Leases

The Company's operating and finance lease right-of-use ("ROU") assets and liabilities as of December 31, 2022 December 31, 2023 and 2021 2022 consisted of the following items (in thousands):

		Year ended December 31,	
		2022	2021
As of		As of	
(in thousands)	(in thousands)	December 31, 2023	December 31, 2022
Leases			
Operating Leases			
Operating Leases			
Operating Leases	Operating Leases		
Operating lease right-of-use assets, net of accumulated amortization	Operating lease right-of-use assets, net of accumulated amortization		
(1)	(1)	\$7,734	\$6,000
Operating lease right-of-use assets, net of accumulated amortization			
(1)			
Operating lease right-of-use assets, net of accumulated amortization			
(1)			
Operating lease obligations, current			

Operating lease obligations, current			
Operating lease obligations, current	Operating lease obligations, current	\$2,724	\$2,157
Long-term operating lease obligations	Long-term operating lease obligations	5,133	4,178
Total operating lease obligation	Total operating lease obligation	\$7,857	\$6,335

Finance Leases

Finance lease right-of-use assets, net of accumulated amortization	Finance lease right-of-use assets, net of accumulated amortization		
(2)	(2)	\$2,565	\$1,743

Finance lease right-of-use assets, net of accumulated amortization

Finance lease right-of-use assets, net of accumulated amortization

Finance lease obligations, current

Finance lease obligations, current	Finance lease obligations, current	\$1,131	\$1,011
Long-term finance lease obligations	Long-term finance lease obligations	3,450	3,152
Total finance lease obligations	Total finance lease obligations	\$4,581	\$4,163

(1) Operating lease assets are reported net of accumulated amortization of \$4.4 million \$5.1 million and \$1.9 million \$4.4 million as of December 31, 2022 December 31, 2023 and 2021, 2022, respectively.

(2) Finance lease assets are reported net of accumulated amortization of \$2.0 million \$2.7 million and \$1.1 million \$2.0 million as of December 31, 2022 December 31, 2023 and 2021, 2022, respectively.

Finance leases

ROU assets under finance leases are reported in the "Property, plant and equipment" line item, and finance lease liabilities are included in the "Current portion of long-term debt" and "Long-term debt, net of current portion" line items in the Consolidated Balance Sheets as of December 31, 2022 December 31, 2023 and 2021, 2022.

Arq, Inc. and Subsidiaries
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Interest expense related to finance lease liabilities and amortization of ROU assets under finance leases are included in the "Interest expense" and "Depreciation, amortization, depletion and accretion" line items respectively, in the Consolidated Statement of Operations for the years ended **December 31, 2022**, **December 31, 2023** and **2021**.

Advanced Emissions Solutions, Inc. and Subsidiaries
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2022.

Operating Leases

ROU assets under operating leases are included in the "Other long-term assets" line item, and operating lease liabilities are included in "Other liabilities" and "Other long-term liabilities" line items, respectively, in the Consolidated Balance Sheets as of **December 31, 2022**, **December 31, 2023** and **2021, 2022**.

Lease expense for operating leases for the year ended December 31, 2023 was \$5.9 million, of which \$4.5 million is included in "Consumables cost of revenue, exclusive of depreciation and amortization" line item and \$1.4 million is included in "General and administrative" line item in the Consolidated Statement of Operations for the year ended **December 31, 2023**. Lease expense for operating leases for the year ended December 31, 2022 was \$4.4 million, of which \$4.0 million is included in the "Consumables cost of revenues, revenue, exclusive of depreciation and amortization" line item and \$0.4 million is included in "General and administrative" line item in the Consolidated Statement of Operations for the year ended December 31, 2022. Lease expense for operating leases for the year ended December 31, 2021 was \$4.0 million, of which \$3.5 million is included in the "Consumables cost of revenues, exclusive of depreciation and amortization" line item and \$0.5 million is included in the "General and administrative" line item in the Consolidated Statement of Operations for the year ended **December 31, 2021**, **December 31, 2022**.

Lease financial information as of and for the years ended **December 31, 2022**, **December 31, 2023** and **2021, 2022** is provided in the following table:

		Year ended December 31,					
		Year ended December 31,				Year ended December 31,	
(in thousands)	(in thousands)	2022	2021	(in thousands)	2023	2022	
Finance lease cost:	Finance lease cost:						
Amortization of right-of-use assets							
Amortization of right-of-use assets							
Amortization of right-of-use assets	Amortization of right-of-use assets	\$ 818	\$ 642				
Interest on lease liabilities	Interest on lease liabilities	307	288				
Operating lease cost	Operating lease cost	3,436	2,430				
Short-term lease cost	Short-term lease cost	989	1,650				
Variable lease cost ⁽¹⁾	Variable lease cost ⁽¹⁾	19	40				
Total lease cost	Total lease cost	\$5,569	\$5,050				
Total lease cost							
Total lease cost							
Other Information:	Other Information:						
Other Information:							
Other Information:							

Cash paid for amounts included in the measurement of lease liabilities:	Cash paid for amounts included in the measurement of lease liabilities:
Cash paid for amounts included in the measurement of lease liabilities:	Cash paid for amounts included in the measurement of lease liabilities:
Operating cash flows from finance leases	Operating cash flows from finance leases
Operating cash flows from operating leases	Operating cash flows from operating leases
Financing cash flows from finance leases	Financing cash flows from finance leases
Right-of-use assets obtained in exchange for new finance lease liabilities	Right-of-use assets obtained in exchange for new finance lease liabilities
Right-of-use assets obtained in exchange for new operating lease liabilities	Right-of-use assets obtained in exchange for new operating lease liabilities
Weighted-average remaining lease term - finance leases	Weighted-average remaining lease term - finance leases
Weighted-average remaining lease term - operating leases	Weighted-average remaining lease term - operating leases
Weighted-average discount rate - finance leases	Weighted-average discount rate - finance leases

Weighted-average discount rate - operating leases	Weighted-average discount rate - operating leases	6.9 %	6.7 %	Weighted-average discount rate - operating leases	11.3 %	6.9 %
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(1) Primarily includes common area maintenance, property taxes and insurance payable to lessors.

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

The following table summarizes the Company's future lease payments under finance and operating leases as of **December 31, 2022** **December 31, 2023**:

(in thousands)	Operating Lease	Finance Lease	Total Lease Commitments
	Commitments	Commitments	
2023	\$ 3,171	\$ 1,371	\$ 4,542
2024	1,798	1,199	2,997
2025	1,519	605	2,124
2026	1,519	372	1,891
2027	491	85	576
Thereafter	2,299	1,406	3,705
Total lease payments	10,797	5,038	15,835
Less: Imputed interest	(2,940)	(457)	(3,397)
Present value of lease payments	\$ 7,857	\$ 4,581	\$ 12,438

In November 2022, the Company executed a new lease for its corporate headquarters and primary laboratory commencing May 1, 2023 and expiring October 31, 2030. Total commitments under the lease include aggregate rental payments of \$3.3 million plus a pro rata portion of operating expenses related to the office and laboratory leased space, which is not included in the table above.

Note 7 - Commitments and Contingencies

Retention Agreements

On May 4, 2022, the Compensation Committee of the Board of Directors and the Board of Directors (the "Board") approved the amendment to retention agreements (the "Retention Agreements" and each a "Retention Agreement"), which had been executed in May 2021, between the Company and its executive officers and certain other key employees in order to maintain the Company's business operations while it pursues and executes on its strategic initiatives (the "Amended Retention Agreements"). Under the Amended Retention Agreements, employees will receive (i) 40% of the original amount agreed to in the Retention Agreements ("Retention Pay") in August 2022; (ii) 60% of the Retention Pay on the earliest of (1) the date the employee's employment is terminated without Cause or for Good Reason (as those terms are defined in the Retention Agreement or the employee's employment agreement, as applicable), (2) 90 days after a Transaction Date or a Change in Control (as those terms are defined in the Retention Agreement or the employee's employment agreement, as applicable), or (3) January 18, 2023; and (iii) an additional lump sum payment, ranging from 10% to 40% of the Retention Pay, will also be paid at the earliest of (1) the date the employee's employment is terminated without Cause or for Good Reason (as those terms are defined in the Retention Agreement or the employee's employment agreement, as applicable), (2) 90 days after a Transaction Date or a Change in Control (as those terms are defined in the Retention Agreement or the employee's employment agreement, as applicable), or (3) in January 2023.

In order to receive the Amended Retention Agreements payments, employees must remain employed at the Company through the dates above. In August 2022, the Company paid out \$1.0 million pursuant to the payment terms of the Amended Retention Agreements. As of December 31, 2022, the total cash payable pursuant to the Amended Retention Agreements was \$1.4 million, and is included in the "Other current liabilities" line item in the Consolidated Balance Sheet. This amount was paid in January 2023.

Surety Bonds and Restricted Cash

As the owner of the Marshall Mine, the Company is required to post a surety bond with a regulatory commission. As of December 31, 2022, the Company had posted a \$16.6 million surety bond (the "MM Surety Bond") which will remain in place until the Marshall Mine is fully reclaimed, and may be further reduced in amount from time to time as the Company progresses with its reclamation activities or eliminated if the MM Sale is consummated.

As the owner of the Five Forks Mine, the Company is required to post a surety bond with a regulatory commission. As of December 31, 2022, the Company had posted a \$7.5 million surety bond related to performance requirements associated with the Five Forks Mine.

(in thousands)	Operating Lease	Finance Lease	Total Lease Commitments
	Commitments	Commitments	
2024	\$ 3,139	\$ 2,274	\$ 5,413
2025	2,930	935	3,865
2026	2,817	372	3,189
2027	1,464	85	1,549

2028	1,131	—	1,131
Thereafter	7,078	—	7,078
Total lease payments	18,559	3,666	22,225
Less: Imputed interest	(7,745)	(201)	(7,946)
Present value of lease payments	\$ 10,814	\$ 3,465	\$ 14,279

Advanced Emissions Solutions, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

As of December 31, 2022, the Company posted cash collateral of \$10.0 million for both the Marshall Mine and Five Forks Mine as required by the Company's surety bond provider, which is reported as long-term restricted cash on the Consolidated Balance Sheets.

Tinuum Group

The Company also has certain limited obligations contingent upon future events in connection with the activities of Tinuum Group. The Company, NexGen Refined Coal, LLC ("NexGen") and two entities affiliated with NexGen have provided another Tinuum Group owner with limited guarantees (the "Tinuum Group Party Guarantees") related to certain losses it may suffer as a result of inaccuracies or breach of representations and covenants. The Company also is a party to a contribution agreement with NexGen under which any party called upon to pay on a Tinuum Group Party Guaranty is entitled to receive contribution from the other party equal to 50% of the amount paid. No liability or expense provision has been recorded by the Company related to this contingent obligation as the Company believes that it is not probable that a loss will occur with respect to Tinuum Group Party Guarantees.

Legal Proceedings

The Company is from time to time subject to various pending or threatened legal actions and proceedings, including those that arise in the ordinary course of its business. Such matters are subject to many uncertainties and outcomes, the financial impacts of which are not predictable with assurance and that may not be known for extended periods of time. The Company records a liability in its consolidated financial statements for costs related to claims, settlements, and judgments where management has assessed that a loss is probable and an amount can be reasonably estimated. There were no significant legal proceedings as of December 31, 2022.

Note 8 - Property, Plant Commitments and Equipment Contingencies

Surety Bonds and Restricted Cash

As the owner of the Five Forks Mine, the Company is required to post a surety bond with a regulatory commission related to performance requirements associated with the Five Forks Mine. As of December 31, 2023, the amount of this surety bond was \$7.5 million.

The cost basis Company leases land adjacent to the Corbin Facility and accumulated depreciation is required to post surety bonds with a regulatory commission for reclamation. As of property, plant December 31, 2023, the amount of these surety bonds was \$3.0 million.

The Company holds permits for an abandoned mine in West Virginia ("Mine 4") and equipment at December 31, 2022 is required to post a surety bond with a regulatory commission for reclamation. As of December 31, 2023, the amount of this surety bond was \$0.7 million.

As of December 31, 2023 and 2021 are summarized in 2022, the table below:

(in thousands)	Life in Years	As of December 31,	
		2022	2021
Land and land improvements	0-31	\$ 1,225	\$ 1,225
Plant and operating equipment	2-29	33,180	31,266
Furniture and fixtures	2-11	1,709	1,388
Machinery and equipment	3-10	2,116	697
Leasehold improvements	3-12	2,149	2,089
Construction in progress		6,373	1,190
		46,752	37,855
Less accumulated depreciation		(11,897)	(7,684)
Total property, plant and equipment, net		\$ 34,855	\$ 30,171

Included in plant Company posted cash collateral of \$8.5 million and operating equipment \$10.0 million, respectively, as of December 31, 2022 and 2021 required by the Company's surety bond providers, which is mining equipment financed under various lease facilities, and obligations due under these facilities are included in finance lease obligations reported as long-term restricted cash in the Consolidated Balance Sheets. The total amount recorded As of December 31, 2023, the Company holds a deposit of \$0.4 million with a third party for ROU collateral as required under a bonding arrangement for Mine 4. This deposit is included in "Other long-term assets, net" in the Consolidated Balance Sheet as of December 31, 2022 and 2021 related December 31, 2023.

The Company has a customer supply agreement, which was renewed January 1, 2024, that requires the Company to finance lease obligations was \$2.6 million and \$1.7 million, respectively, net post a performance bond in an amount equal to the annual contract value of accumulated depreciation of \$2.0 million and \$1.1 million \$3.7 million.

Depreciation expense Red River Plant Construction Contract

In January 2024, the Company executed a contract with a third-party contractor for the years ended December 31, 2022 construction of a GAC facility at the Red River Plant, and 2021 was \$4.9 million immediately commenced construction operations. The Company expects to complete the GAC Facility by the end of 2024 and \$5.5 million,

respectively, estimates that total construction costs will be in the range of \$62.0 - \$67.0 million.

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Tinuum Group

The Company also has certain limited obligations contingent upon future events in connection with the activities of Tinuum Group. The Company, NexGen Refined Coal, LLC ("NexGen") and two entities affiliated with NexGen have provided another Tinuum Group owner with limited guarantees (the "Tinuum Group Party Guarantees") related to certain losses it may suffer as a result of inaccuracies or breach of representations and covenants. The Company also is a party to a contribution agreement with NexGen under which any party called upon to pay on a Tinuum Group Party Guaranty is entitled to receive contribution from the other party equal to 50% of the amount paid. No liability or expense provision has been recorded by the Company related to this contingent obligation as the Company believes that it is not probable that a loss will occur with respect to Tinuum Group Party Guarantees.

In December 2022, the Company, certain of the other owners of Tinuum Group (collectively, the "Tinuum Group Owners") and Tinuum Group executed the Distribution and Repayment Agreement (the "Repayment Agreement"). Under the terms of the Repayment Agreement, the Tinuum Group Owners received cash distributions (the "Distributions") equal to their percentage ownership and also agreed to be contractually liable for certain contingent liabilities of Tinuum Group (the "Tinuum Group Obligation") in amounts equal to their percentage ownership. In December 2022, the Company received its percentage share of the Distributions in the amount of \$2.0 million and became contractually liable for \$1.7 million of the Tinuum Group Obligation. As of December 31, 2022, the Company recorded the contractual obligation of \$1.7 million as a liability in the "Other current liabilities" line item in the Consolidated Balance Sheet, with the difference between the cash distribution of \$0.3 million recorded to equity method earnings for the year ended December 31, 2022. In the event that the Tinuum Group Obligation is discharged in its entirety or settled for an amount that is less than the total Tinuum Group Obligation, the Company will recognize future equity earnings for the difference in its contractual obligation amount and its pro rata share of the actual payment made by Tinuum Group, if any, for the Tinuum Group Obligation.

Marken Separation Agreement

Pursuant to Mr. Marken's termination as CEO of the Company effective July 17, 2023, the Company and Mr. Marken executed a separation agreement under which Mr. Marken will receive the following payments and benefits: (i) the severance payments and benefits set forth in the terms of his employment agreement upon a termination without "cause," (ii) accelerated vesting of 49,715 shares of restricted stock, (iii) continued eligibility for possible vesting of a pro rata target number of 25,941 performance share units ("PSUs") granted in 2021, subject to achievement of applicable performance measures, (iv) continued eligibility for possible vesting of a pro rata target number of 15,988 PSUs granted in 2022, subject to achievement of applicable performance measures, and (v) continued eligibility for possible vesting of a pro rata target number of 19,834 PSUs granted in 2023, subject to achievement of applicable performance measures. As of December 31, 2023, the amount of the liability related to (i) and (ii) above was \$0.4 million.

Legal Proceedings

The Company is from time to time subject to various pending or threatened legal actions and proceedings, including those that arise in the ordinary course of its business. Such matters are subject to many uncertainties and outcomes, the financial impacts of which are not predictable with assurance and that may not be known for extended periods of time. The Company records a liability in its consolidated financial statements for costs related to claims, settlements, and judgments where management has assessed that a loss is probable and an amount can be reasonably estimated. There were no significant legal proceedings as of December 31, 2023.

Note 9 - Marshall Mine, LLC

On March 27, 2023, (the "MM Closing Date"), the Company completed the sale of all of its membership interests in Marshall Mine, LLC to a third party (the "Buyer") in exchange for cash payment of \$2.2 million (the "MM Purchase Price") made by the Company to the Buyer and the assumption by the Buyer of certain liabilities of Marshall Mine, LLC. As of the MM Closing Date, Marshall Mine, LLC had outstanding liabilities of approximately \$4.9 million that were discharged upon payment of the MM Purchase Price by the Company, and the Company recognized a gain of approximately \$2.7 million in the Statement of Operations for the year ended December 31, 2023.

Arq, Inc. and Subsidiaries
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Note 9 10 - Supplemental Financial Information

Supplemental Balance Sheet Information

The following table summarizes the components of "Prepaid expenses and other current assets" and "Other long-term assets, net" as presented in the Consolidated Balance Sheets:

(in thousands)	(in thousands)	As of December 31,		(in thousands)	As of December 31,	
		2022	2021		2023	2022
Prepaid expenses and other current assets:	Prepaid expenses and other current assets:					
Prepaid expenses	Prepaid expenses	\$ 2,570	\$ 2,571			
Prepaid expenses						

Prepaid expenses			
Prepaid income taxes and income tax refunds	Prepaid income taxes and income tax refunds	2,573	2,782
Other	Other	2,395	1,308
		<u>\$ 7,538</u>	<u>\$ 6,661</u>
Other			
Other		—	
		<u>\$</u>	
Other long-term assets:	Other long-term assets:		
Right of use assets, operating leases, net			
Right of use assets, operating leases, net			
Right of use assets, operating leases, net	Right of use assets, operating leases, net	\$ 7,734	\$ 6,000
Spare parts, net	Spare parts, net	6,789	4,598
Upfront customer consideration	Upfront customer consideration		
(1)	(1)	6,475	6,982
Mine development costs, net		5,478	5,330
Mine reclamation asset, net	Mine reclamation asset, net	1,641	1,742
Intangible assets, net	Intangible assets, net	847	1,237
Norit receivable		—	6,846
Equity method investments		—	2,391
Mine development costs, net			
Mine development costs, net			
Mine development costs, net			
Other long-term assets	Other long-term assets	1,683	1,745
		<u>\$30,647</u>	<u>\$36,871</u>
Other long-term assets			
Other long-term assets		—	
		<u>\$</u>	

(1) See further discussion Represent remaining balance on consideration paid to a customer under a long-term supply contract executed in 2020. This asset is being amortized as a reduction to revenue on a straight-line basis over the expected 15-year contractual period of Upfront Customer Consideration in Note 3, the contract.

Spare parts include critical spares required to support plant operations. Parts and supply costs are determined using the lower of cost or estimated replacement cost. Parts are recorded as maintenance expenses or capitalized in the period in which they are consumed or put into use.

Mine development costs include acquisition costs, the cost of other development work and mitigation costs related to the Five Forks Mine and are depleted over the estimated life of the related mine reserves, which is estimated to be 12.14 years as of December 31, 2022 December 31, 2023. The Company performs an evaluation of the recoverability of the carrying value of mine development costs to determine if facts and circumstances indicate that their carrying value may be impaired and if any adjustment is warranted. Mine reclamation asset represents the ARO asset related to the Five Forks Mine and is depreciated over its estimated life.

Highview Investment

Other includes a long-term investment (the "Highview Investment") in Highview Enterprises Limited ("Highview"), a London, England based developmental stage company specializing in power storage. The Company accounts for the Highview Investment as an investment recorded at cost, less impairment, plus or minus observable changes in price

for identical or similar investments of the same issuer. Fair value measurements, if any, represent Level 2 measurements. The Highview Investment is evaluated for indicators of impairment such as an event or change in circumstances that may have a significant adverse effect on the fair value of the investment.

There were no changes to the carrying value of the Highview Investment for the years ended **December 31, 2022**, **December 31, 2023** and **2021**, **2022** as there were no indicators of impairment or observable price changes for equity issued by Highview. Since inception of Highview Investment, the Company has recognized \$2.2 million of cumulative impairment losses.

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The following table details the components of "Other current liabilities" and "Other long-term liabilities" as presented in the Consolidated Balance Sheets:

		As of December 31,		As of December 31,	
(in thousands)	(in thousands)	2022	2021	(in thousands)	2022
Other current liabilities:	Other current liabilities:				
Current portion of operating lease obligations	Current portion of operating lease obligations	\$ 2,724	\$ 2,157		
Current portion of operating lease obligations					
Current portion of operating lease obligations					
Income and other taxes payable		1,039	807		
Sales, use and other taxes payable					
Sales, use and other taxes payable					
Sales, use and other taxes payable					
Current portion of mine reclamation liability	Current portion of mine reclamation liability	548	1,775		
Other current liabilities (1)	Other current liabilities (1)	2,334	385		
		\$ 6,645	\$ 5,124		
Other current liabilities (1)					
Other current liabilities (1)					
\$					
Other long-term liabilities:	Other long-term liabilities:				
Mine reclamation liabilities					
Mine reclamation liabilities					

Mine reclamation liabilities	Mine reclamation liabilities	\$ 7,985	\$ 8,184
Operating lease obligations, long-term	Operating lease obligations, long-term	5,133	4,178
Other	Other	733	—
		<u>\$13,851</u>	<u>\$12,362</u>
Other			
Other			
		<u>\$</u>	

(1) Include Included in Other current liabilities as of December 31, 2023 and 2022 is \$1.7 million related to the Repayment Agreement as defined in Note 10, 15.

The Mine reclamation liability related to the Five Forks Mine is included in "Other long-term liabilities". The Mine reclamation liability related to Marshall Mine, which was assumed in the Marshall Mine Acquisition, is included in "Other current liabilities" and "Other long-term liabilities." The Mine reclamation liabilities represent AROs. Changes in the AROs were as follows:

As of December 31,						
As of December 31,		As of December 31,				
(in thousands)	(in thousands)	2022	2021	(in thousands)	2023	2022
Asset retirement obligations, beginning of year	Asset retirement obligations, beginning of year	\$9,959	\$21,447			
Asset retirement obligations assumed ⁽¹⁾						
Accretion	Accretion	611	1,102			
Liabilities settled		(2,071)	(10,010)			
Liabilities settled ⁽²⁾						
Changes due to scope and timing of reclamation	Changes due to scope and timing of reclamation	34	(2,580)			
Asset retirement obligations, end of year	Asset retirement obligations, end of year	8,533	9,959			
Less current portion	Less current portion	548	1,775			
Asset retirement obligations, long-term	Asset retirement obligations, long-term	\$7,985	\$ 8,184			

(1) Represents the Corbin Facility ARO and Mine 4 ARO in the amounts of \$0.5 million and \$1.0 million, respectively.

(2) Includes the removal of a reclamation liability associated with Marshall Mine, LLC as a result of its sale to a third party in March 2023.

Supplemental Consolidated Statements of Operations Information

Gain on Change in estimate, asset retirement obligation

As discussed in Note 3, for the year ended December 31, 2021, recorded a gain on change in estimate of \$2.7 million based on its revisions in its estimate of future obligations owed for the reclamation of Marshall Mine.

The following table details the components of "Interest expense" in the Consolidated Statements of Operations:

		Years Ended December 31,	
		Years Ended December 31,	
		Years Ended December 31,	
(in thousands)			
(in thousands)			
(in thousands)			
		Years Ended December 31,	
		2022	2021
(in thousands)			
Interest on Senior Term Loan	\$	—	\$ 206
Debt discount and debt issuance costs		—	945
453A interest		—	13
Interest on CFG Loan			
Interest on CFG Loan			
Interest on CFG Loan			
Interest on CTB Loan			
Interest on CTB Loan			
Interest on CTB Loan			
Other			
Other			
Other	Other	336	326
Total Interest expense	Total Interest expense	\$ 336	\$ 1,490
Total Interest expense			
Total Interest expense			

Advanced Emissions Solutions, Arq, Inc. and Subsidiaries
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The following table details the components of "Other" in the Consolidated Statements of Operations:

		Years Ended December 31,	
		Years Ended December 31,	
		Years Ended December 31,	
		Years Ended December 31,	
(in thousands)	(in thousands)	2022	2021
(in thousands)			
(in thousands)			
Interest income			
Interest income			
Interest income	Interest income	\$ 239	\$ 326
Other	Other	(84)	314
Other			
Other			
Total Other income	Total Other income	\$ 155	\$ 640
Total Other income			
Total Other income			

Note 10 - Equity Method Investments

Tinuum Group, LLC

The following table summarizes the results of operations of Tinuum Group:

(in thousands)	Years Ended December 31,	
	2022	2021
Gross profit	\$ 964	\$ 6,995
Operating, selling, general and administrative expenses	4,275	49,414
Loss from operations	(3,311)	(42,419)
Other income	1,231	9,726
(Income) loss attributable to noncontrolling interest	(874)	126,948
Net (loss) income available to members	\$ (2,954)	\$ 94,255
ADES equity earnings from Tinuum Group	\$ 3,455	\$ 61,837

As of December 31, 2022 and 2021, the carrying value of the Company's investment in Tinuum Group was zero as the cumulative amount of distributions received from Tinuum Group exceeded the Company's cumulative pro-rata share of Tinuum Group's net income available to Class A members. As a result, for the years ended December 31, 2022 and 2021, the Company recognized earnings from Tinuum Group's net income available to members that was different from its pro-rata share of Tinuum Group's net income available to members.

In December 2022, the Company, certain of the other owners of Tinuum Group (collectively, the "Tinuum Group Owners") and Tinuum Group executed the Distribution and Repayment Agreement (the "Repayment Agreement"). Under the terms of the Repayment Agreement, the Tinuum Group Owners received cash distributions (the "Distributions") equal to their percentage ownership and also agreed to be contractually liable for certain contingent liabilities of Tinuum Group (the "Tinuum Group Obligation") in amounts equal to their percentage ownership. In December 2022, the Company received its percentage share of the Distributions in the amount of \$2.0 million and became contractually liable for \$1.7 million of the Tinuum Group Obligation. The Company recorded the Company's contractual obligation of \$1.7 million as a liability in the "Other current liabilities" line item in the Consolidated Balance Sheet as of December 31, 2022, with the difference between the cash distribution of \$0.3 million recorded to equity method earnings for the year ended December 31, 2022. In the event that the Tinuum Group Obligation is discharged in its entirety or settled for an amount that is less than the total Tinuum Group Obligation, the Company will recognize future equity earnings for the difference in its contractual obligation amount and its pro rata share of the actual payment made by Tinuum Group, if any, for the Tinuum Group Obligation.

Advanced Emissions Solutions, Inc. and Subsidiaries
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The following table presents the Company's investment balance, equity earnings, cash distributions and cash distributions in excess of the investment balance for the years ended December 31, 2022 and 2021 (in thousands):

Description	Date(s)	ADES equity			Memorandum Account: Cash distributions and equity loss in (excess) of investment balance
		Investment balance	earnings (loss)	Cash distributions	
Beginning balance	12/31/2020	\$ 3,387	\$ —	\$ —	\$ —
ADES proportionate share of net income from Tinuum Group	2021 activity	40,058	40,058	—	—
Cash distributions from Tinuum Group	2021 activity	(65,224)	—	65,224	—
Adjustment for current year cash distributions in excess of investment balance	2021 activity	21,779	21,779	—	(21,779)
Total investment balance, equity earnings (loss) and cash distributions	12/31/2021	\$ —	\$ 61,837	\$ 65,224	\$ (21,779)
ADES proportionate share of net loss from Tinuum Group	2022 activity	(1,255)	(1,255)	—	(1,255)
Cash distributions from Tinuum Group	2022 activity	(3,455)	—	3,455	(3,455)
Adjustment for current year cash distributions in excess of investment balance	2022 activity	4,710	4,710	—	—
Total investment balance, equity earnings and cash distributions	12/31/2022	\$ —	\$ 3,455	\$ 3,455	\$ (26,489)

Tinuum Services, LLC

The following tables summarizes the results of operations of Tinuum Services:

(in thousands)	Years Ended December 31,	
	2022	2021
Gross profit (loss)	\$ 1,065	\$ (68,465)
Operating, selling, general and administrative expenses	2,800	166,075
Loss from operations	(1,735)	(234,540)

Other income (expenses), net	1,159	3,830
Loss attributable to noncontrolling interest	323	246,094
Net (loss) income	<u>\$ (253)</u>	<u>\$ 15,384</u>
ADES equity earnings from Tinnuum Services	<u>\$ 85</u>	<u>\$ 6,952</u>

Included in the Consolidated Statement of Operations of Tinnuum Services for the years ended December 31, 2022 and 2021 were losses related to VIE entities that are consolidated within Tinnuum Services. These losses do not impact the Company's equity earnings from Tinnuum Services as 100% of those losses are attributable to a noncontrolling interest and eliminated in the calculations of Tinnuum Services' net income attributable to the Company's interest.

Advanced Emissions Solutions, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

The following table presents the Company's investment balance, equity earnings, cash distributions and cash distributions in excess of the investment balance for the year ended December 31, 2022 (in thousands):

Description	Date(s)	Investment balance	ADES equity earnings	Cash distributions	Memorandum
					Account: Cash distributions and equity earnings in (excess) of investment balance
Beginning balance	12/31/2021	\$ 2,391	\$ —	\$ —	\$ —
ADES proportionate share of net loss from Tinnuum Services	2022 activity	(127)	(127)	—	—
Cash distributions from Tinnuum Services	2022 activity	(2,476)	—	2,476	—
Adjustment for current year cash distributions in excess of investment balance	2022 activity	212	212	—	(212)
Total investment balance, equity earnings and cash distributions	12/31/2022	<u>\$ —</u>	<u>\$ 85</u>	<u>\$ 2,476</u>	<u>\$ (212)</u>

The Company evaluates its equity method investments for impairment whenever events or changes in circumstances indicate that the carrying amount of the investment might not be recoverable. As of December 31, 2021, the Company concluded the carrying amount of its investment in Tinnuum Services was not fully recoverable and as a result, wrote down its investment in the amount of \$0.7 million, which is included in the "Earnings from equity method investments" line item in the Consolidated Statement of Operations for the year ended December 31, 2021.

Other

The following table details the carrying value of the Company's respective equity method investments included in the "Other long-term assets, net" line item on the Consolidated Balance Sheets and indicates the Company's maximum exposure to loss:

(in thousands)	As of December 31,	
	2022	2021
Equity method investment in Tinnuum Services	—	2,391
Total equity method investments	<u>\$ —</u>	<u>\$ 2,391</u>

The following table details the components of the Company's respective earnings or loss from equity method investments included in the "Earnings from equity method investments" line item in the Consolidated Statements of Operations:

(in thousands)	Year ended December 31,	
	2022	2021
Earnings from Tinnuum Group	\$ 3,455	\$ 61,837
Earnings from Tinnuum Services	85	6,952
Earnings (loss) from other	1	(63)
Earnings from equity method investments	<u>\$ 3,541</u>	<u>\$ 68,726</u>

The following table details the components of the cash distributions from the Company's respective equity method investments included as a component of cash flows from operating activities in the Consolidated Statements of Cash Flows. Distributions from equity method investees are reported in the Consolidated Statements of Cash Flows as "return on investment" in Operating cash flows until such time as the carrying value in an equity method investee company is reduced to zero. Thereafter, such distributions are reported as "distributions in excess of cumulative earnings" as a component of cash flows from investing activities.

Advanced Emissions Solutions, Inc. and Subsidiaries
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(in thousands)	Year ended December 31,	
	2022	2021
Distributions from equity method investees, return on investment		
Tinuum Services	\$ 2,297	\$ 8,802
Tinuum Group	—	14,142
	<u>\$ 2,297</u>	<u>\$ 22,944</u>
Distributions from equity method investees in excess of cumulative earnings		
Tinuum Group	\$ 3,455	\$ 51,082
Tinuum Services	179	—
Other	2	—
	<u>\$ 3,636</u>	<u>\$ 51,082</u>

Note 11 - Stockholders' Equity

The Company has two classes of capital stock authorized, common stock and preferred stock, which are described as follows:

Preferred Stock

The Company's Board of Directors (the "Board") is authorized to provide out of the unissued shares of Preferred Stock and to fix the number of shares constituting a series of Preferred Stock and, with respect to each series, to fix the number of shares and designation of such series, the voting powers, if any, the preferences and relative, participating, option or other special rights, if any, and any qualifications, limitations or restrictions thereof, of the shares of such series. As of **December 31, 2022** **December 31, 2023** and **2021, 2022**, there were no shares of Preferred Stock designated or outstanding. **See further discussion of subsequent preferred stock designation and issuance in Note 17.**

Common Stock

Holders of common stock are entitled to one vote for each share held of record on all matters submitted to a vote of the stockholders. Additionally, holders of common stock are entitled to receive dividends when and if declared by the Board, subject to any statutory or contractual restrictions on payment of dividends and to any restrictions on the payment of dividends imposed by the terms of any outstanding shares of preferred stock.

Upon dissolution, liquidation or the sale of all or substantially all of the Company's assets, after payment in full of any amounts required to be paid to creditors and to the holders of preferred stock having liquidation preferences, if any, the holders of shares of common stock will be entitled to receive the Company's remaining assets for distribution on a pro rata basis.

Equity Transactions

As discussed in Note 2:

- On February 1, 2023, and as consideration for the Arq Acquisition, the Company issued 3,814,864 shares of common stock and 5,294,462 shares of Series A Preferred Stock. Additionally, the Company completed the PIPE Investment and sold 3,842,315 shares of common stock for cash proceeds of \$15.4 million.
- On March 31, 2023, the Company declared a dividend of 68,464 Series A PIK Shares with respect to the accrued dividends on the Series A Preferred Stock, which was recorded at the estimated fair value of \$0.2 million as of March 31, 2023 and was paid on April 21, 2023.
- On June 13, 2023, pursuant to stockholder approval, all shares of Series A Preferred Stock were converted into 5,362,926 shares of common stock.

On July 14, 2023, the Board appointed Mr. Robert Rasmus to the positions of President and Chief Executive Officer effective July 17, 2023. On July 17, 2023, the Company entered into a Subscription Agreement (the "Subscription Agreement") with Mr. Rasmus and entities controlled by Mr. Rasmus, in connection with his appointment as the Company's President and Chief Executive Officer. Pursuant to the Subscription Agreement, Mr. Rasmus subscribed for and agreed to purchase 950,000 shares of common stock from the Company for an aggregate purchase price of \$1.8 million (at a price per share of approximately \$1.90). In September 2023, the Company received cash of \$1.0 million and issued 527,779 shares of common stock to Mr. Rasmus pursuant to the Subscription Agreement.

Stock Repurchase Programs

In November 2018, the Board authorized the Company to purchase up to \$20.0 million of its outstanding common stock under a stock repurchase program (the "Stock Repurchase Program"), **which was to remain in effect until December 31, 2019 unless otherwise modified by the Board.** In November 2019, the Board authorized an incremental \$7.1 million to the Stock Repurchase Program and provided that it will remain in effect until all amounts are utilized or it is

Arq, Inc. and Subsidiaries **Notes to Consolidated Financial Statements**

otherwise modified by the Board. As of **December 31, 2022** **December 31, 2023**, the Company had \$7.0 million remaining under the Stock Repurchase Program.

Tax Asset Protection Plan

U.S. federal income tax rules, and Section 382 of the Internal Revenue Code in particular, could substantially limit the use of Section 45 tax credits and other tax assets if the Company experiences an "ownership change" (as defined in the Internal Revenue Code). In general, an ownership change occurs if there is a cumulative change in the ownership of the Company by "5 percent stockholders" that exceeds 50 percentage points over a rolling three-year period.

An entity that experiences an ownership change generally will be subject to an annual limitation on its pre-ownership change tax loss and credit carryforwards equal to the equity value of the entity immediately before the ownership change, multiplied by the long-term, tax-exempt rate posted monthly by the Internal Revenue Service ("IRS") (subject to certain adjustments). The annual limitation would be increased each year to the extent that there is an unused limitation in a prior year.

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On May 5, 2017, the Board approved the declaration of a dividend of rights to purchase Series B Junior Participating Preferred Stock for each outstanding share of common stock as part of a tax asset protection plan (the "TAPP"), which is designed to protect the Company's ability to utilize its net operating losses and tax credits. The TAPP is intended to act as a deterrent to any person acquiring beneficial ownership of 4.99% or more of the Company's outstanding common stock. During the years 2018-2022, we executed amendments to the TAPP (the "TAPP Amendments"), which amended the definition of "Final Expiration Date" under the TAPP to extend the duration of the TAPP and makes associated changes in connection therewith. The most recent TAPP Amendment was approved at our 2022 annual meeting of stockholders and extended the Final Expiration Date to the close of business on December 31, 2023.

Note 12 - Stock-Based Compensation

On May 16, 2022, the Company's stockholders approved the 2022 Omnibus Incentive Plan (the "2022 Plan"), which permits grants of awards to employees, directors and consultants. Awards may be in the form of options (both nonqualified stock options and incentive stock options), stock appreciation rights, restricted stock, restricted stock units, performance share units, and other stock-based awards and cash-based awards as described under the 2022 Plan. As of December 31, 2022 December 31, 2023, the Company has 1,403,043 190,281 shares of its common stock authorized for issuance under the 2022 Plan.

On June 20, 2017, the Company's stockholders approved the 2017 Omnibus Incentive Plan (the "2017 Plan"), which permits grants of awards to employees, directors and non-employees. Awards may be in the form of shares, rights to purchase restricted stock, bonuses of restricted stock, or other rights or benefits as described under the 2017 Plan. As of December 31, 2022 December 31, 2023, the Company has zero shares of its common stock authorized for issuance under the 2017 Plan.

Expense

RSAs - Restricted Stock Awards ("RSA's") are typically granted with vesting terms of three years. The fair value of RSAs is determined based on the closing price of the Company's common stock on the authorization date of the grant multiplied by the number of shares subject to the stock award. Compensation expense for RSAs is generally recognized over the vesting term on a straight-line basis.

PSUs - Performance share units ("PSU's") generally vest over three years and are based on the grantee's continuous service with the Company, performance measures or a combination of both. Each PSU represents a contingent right to receive shares of the Company's common stock if the Company meets certain performance measures over the requisite period.

Compensation expense is recognized for PSU awards on a straight-line basis over the vesting period based on the estimated fair value at the date of grant using a Monte Carlo simulation model. The Company's Monte Carlo simulation models include the following assumptions:

- **Risk-free interest rate** - The risk-free interest rate for PSUs granted during the period was determined by using a zero-coupon, U.S. Treasury rate for the periods that coincided with the expected terms listed above.
- **Dividends** - As the PSUs granted receive dividend equivalent units, no discount was applied for any dividends declared.
- **Expected volatility** - To calculate expected volatility, the historical volatility of the Company's common stock was used.
- **Performance period** - The Company's performance period is based on the vesting term of the Company's PSU awards.

Stock Options

Stock options vest over three years and have a contractual limit of ten years from the date of grant to exercise. The fair value of stock options granted is determined on the date of grant using the Black-Scholes option pricing model, and the related expense is recognized on a straight-line basis over the entire vesting period. The determination of the grant date fair value of stock options issued is affected by a number of variables, including the fair value of the Company's common stock, the expected common stock price volatility over the expected term of the stock option, the expected term of the stock option, risk-free interest rates, and the expected dividend yield of the Company's common stock. The Company's Black Scholes option pricing models include the following assumptions:

- **Risk-free interest rate** - The risk-free interest rate for stock options granted during the period was determined by using a zero-coupon U.S. Treasury rate for the periods that coincided with the expected term of the options.
- **Dividend yield** - An expected dividend yield of zero was included in the calculations, as the Company does not currently pay nor does it anticipate paying dividends on its common stock as of the grant date of the stock options.
- **Expected volatility** - To calculate expected volatility, the historical volatility of the Company's common stock was used.

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- **Expected term** - The Company's expected term of stock options was calculated using a simplified method whereby the midpoint between the vesting date and the end of the contractual term is utilized to compute the expected term, as the Company does not have sufficient historical data for options with similar vesting and contractual terms.

The following table indicates the weighted average assumptions that were used related to the awards granted during the year ended December 31, 2023:

	Year ended December 31, 2023
Stock options granted:	1,000,000
Risk-free interest rate	4 %
Dividend yield	— %
Volatility	62 %
Expected term (in years)	6

The Company recorded the following compensation expense related to the Stock Plans:

		Years Ended December 31,	
(in thousands)	(in thousands)	2022	2021
(in thousands)			
(in thousands)			
RSA expense	RSA expense	\$ 1,679	\$ 1,816
RSA expense			
RSA expense			
PSU expense			
PSU expense			
PSU expense			
Stock option expense			
Stock option expense			
Stock option expense			
Total stock-based compensation expense			
PSU expense		302	111
Total stock-based compensation expense			
Total stock-based compensation expense	Total stock-based compensation expense	\$ 1,981	\$ 1,927

Stock-based compensation expense related to manufacturing employees and administrative employees is included in the "Consumables cost of revenues, revenue, excluding depreciation and amortization" and "Payroll and benefits" line items in the Consolidated Statements of Operations. Stock-based compensation expense related to non-employee directors and consultants is included in the "General and administrative" line item in the Consolidated Statements of Operations.

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The Company recognizes forfeitures as they occur.

The amount of unrecognized compensation cost as of December 31, 2022 December 31, 2023, and the expected weighted-average period over which the cost will be recognized is as follows:

		As of December 31, 2022				As of December 31, 2023	
(in thousands)	(in thousands)	Cost	Period of Recognition (in years)	(in thousands)		Unrecognized Compensation Cost	Expected Weighted-Average Period of Recognition (in years)
RSA expense	RSA expense	\$ 2,489	1.75	RSA expense	\$ 1,412	1.67	1.67
Stock option expense				Stock option expense	618		2.54
PSU expense	PSU expense	561	1.32				
PSU expense							
PSU expense					994		1.36

Total unrecognized stock-based compensation expense	Total unrecognized stock-based compensation expense	\$ 3,050	1.43	Total unrecognized stock-based compensation expense	\$ 3,024	1.30	1.30
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Arq, Inc. and Subsidiaries
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Activity

Restricted Stock

A summary of activity of RSAs for the year ended **December 31, 2022** **December 31, 2023** is presented in the following table:

		Restricted Stock	Weighted-Average Grant Date Fair Value
		Restricted Stock	
		Restricted Stock	
		Restricted Stock	
(in thousands, except for share and per share amounts)			
(in thousands, except for share and per share amounts)			
(in thousands, except for share and per share amounts)	(in thousands, except for share and per share amounts)	Awards	RSA's
For the year ended December 31, 2022			
Non-vested at January 1, 2022		531,623	\$ 5.94
For the year ended December 31, 2023			
For the year ended December 31, 2023			
For the year ended December 31, 2023			
Non-vested at January 1, 2023			
Non-vested at January 1, 2023			
Non-vested at January 1, 2023			
Granted			
Granted			
Granted	Granted	462,135	\$ 5.69
Vested	Vested	(267,973)	\$ 6.35
Vested			
Vested			
Forfeited	Forfeited	(72,823)	\$ 5.96
Non-vested at December 31, 2022		652,962	\$ 5.58
Forfeited			
Forfeited			
Non-vested at December 31, 2023			
Non-vested at December 31, 2023			
Non-vested at December 31, 2023			

The weighted-average grant date fair value of RSAs granted or modified for the years ended **December 31, 2022** **December 31, 2023** and **2021** **2022** was **\$5.69** **\$1.91** and **\$5.54**, **\$5.69**, respectively. The total grant-date fair value of RSAs vested for the years ended **December 31, 2022** **December 31, 2023** and **2021** **2022** was **\$1.7 million** **\$2.0 million** and **\$1.5 million** **\$1.7 million**, respectively. The aggregate intrinsic value of non-vested RSAs outstanding as of **December 31, 2022** **December 31, 2023** was **\$1.6 million** **\$2.4 million**.

PSUs

PSUs outstanding remain unvested until either the requisite performance condition of the grant is met, or the third anniversary of their issuance date, at which time the actual number of vested shares will be determined based on the actual price performances of the Company's common stock relative to a broad stock index and a peer group performance index.

A summary of PSU activity for the year ended **December 31, 2022** **December 31, 2023** is presented in the table below:

	Units	Weighted-Average Grant Date Fair Value	Aggregate Intrinsic Value (in thousands)	Weighted-Average Remaining Contractual Term (in years)
For the year ended December 31, 2022				
PSU's outstanding, January 1, 2022	88,026	\$ 6.65		

	Units	Weighted-Average Grant Date Fair Value	Aggregate Intrinsic Value (in thousands)	Weighted-Average Remaining Contractual Term (in years)
For the year ended December 31, 2023				
PSU's outstanding, January 1, 2023				
PSU's outstanding, January 1, 2023				
PSU's outstanding, January 1, 2023				
Granted				
Granted				
Granted	Granted	60,565	9.59	
Vested / Settled	Vested / Settled	—	—	
Vested / Settled				
Vested / Settled				
Forfeited / Canceled	Forfeited / Canceled	—	—	
PSU's outstanding, December 31, 2022	148,591	\$ 7.85	\$ 361	1.32
Forfeited / Canceled				
Forfeited / Canceled				
PSU's outstanding, December 31, 2023				
PSU's outstanding, December 31, 2023				
PSU's outstanding, December 31, 2023				
PSU's outstanding, December 31, 2023	968,918	\$ 2.06	\$ 2,887	1.33

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Stock Options

A summary of stock option activity for the year ended December 31, 2023 is presented below:

	Number of Options Outstanding and Exercisable	Weighted-Average Exercise Price	Aggregate Intrinsic Value	Weighted-Average Remaining Contractual Term (in years)
--	---	------------------------------------	---------------------------	--

For the year ended December 31, 2023				
Options outstanding, Options outstanding at January 1, 2023	—	\$	—	
Options granted	1,000,000		3.00	
Options exercised	—		—	
Options expired / forfeited	—		—	
Options outstanding, Options outstanding at December 31, 2023	1,000,000	\$	3.00	\$ — 9.54
Options vested and exercisable at December 31, 2023	—	\$	—	\$ — 0

Note 13 - Income Taxes

The sources of pretax loss are as follows:

(in thousands)	Years ended December 31,	
	2023	2022
Domestic	\$ (9,123)	\$ (8,708)
Foreign	(2,973)	—
	\$ (12,096)	\$ (8,708)

The provision for income taxes consists of the following:

(in thousands, except for rate)	(in thousands, except for rate)	Years Ended December 31,	
		2022	2021
(in thousands, except for rate)			
(in thousands, except for rate)			
Current portion of income tax expense:			
Current portion of income tax expense:			
Current portion of income tax expense:	Current portion of income tax expense:		
Federal	Federal	\$ (10)	\$ 2,741
Federal			
Federal			
State and other			
State and other	State and other	219	2,326
		153	
		209	5,067
		153	
		153	
Deferred portion of income tax expense (benefit):			
Deferred portion of income tax expense (benefit):			
Deferred portion of income tax expense (benefit):	Deferred portion of income tax expense (benefit):		
Federal	Federal	—	9,527
Federal			
Federal			
State and other			
State and other	State and other	—	1,078
		—	
		—	10,605
		—	

Total income tax expense					
Total income tax expense					
Total income tax expense	Total income tax expense	\$	209	\$	15,672
Effective tax rate	Effective tax rate		(2) %		21 %
Effective tax rate					
Effective tax rate					

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Income tax expense (benefit) differed from the amount that would be computed by applying the U.S. statutory federal income tax rate of 21% to **income loss** before income taxes for the years ended **December 31, 2022** **December 31, 2023** and **2021** **2022** as follows:

(in thousands)	Years Ended December 31,	
	2022	2021
Federal statutory rate	\$ (1,829)	\$ 15,975
State income taxes, net of federal benefit	115	2,283
Permanent differences	1,284	(680)
Tax credits	—	(443)
Valuation allowances	825	(1,290)
Changes in tax rates	(87)	(33)
Stock-based compensation	10	86
Return to provision and other true-ups	(109)	(40)
Other	—	(186)
Income tax expense	\$ 209	\$ 15,672

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Notes to Consolidated Financial Statements

(in thousands)	Years Ended December 31,	
	2023	2022
Federal statutory rate	\$ (2,540)	\$ (1,829)
State income taxes, net of federal benefit	116	115
Permanent differences	755	1,284
Valuation allowances	1,385	825
Changes in tax rates	(74)	(87)
Stock-based compensation	367	10
Return to provision and other true-ups	144	(109)
Income tax expense	\$ 153	\$ 209

Deferred income taxes are provided for the effects of temporary differences between the tax basis of an asset or liability and their reported amounts in the accompanying Consolidated Balance Sheets. These temporary differences result in taxable or deductible amounts in future years. Details of the Company's deferred tax assets and liabilities are summarized as follows:

(in thousands)	(in thousands)	As of December 31,		(in thousands)	As of December 31,	
		2022	2021		2023	2022
Deferred tax assets	Deferred tax assets					
Tax credits						
Tax credits						
Tax credits	Tax credits	\$86,125	\$86,097			

Net operating loss carryforwards	Net operating loss carryforwards	2,892	2,388
Intangible assets	Intangible assets	2,638	5,126
Employee related liabilities	Employee related liabilities	1,968	1,971
Operating lease obligations	Operating lease obligations	1,828	1,585
ARO, net of reimbursements	ARO, net of reimbursements	1,448	—
Research and development capitalization	Research and development capitalization	739	—
Other investments	Other investments	518	556
Equity method investments	Equity method investments	325	1,584
Inventory	Inventory	315	—
Interest limitations	Interest limitations	77	—
Other	Other	429	138
Total deferred tax assets	Total deferred tax assets	99,302	99,445
Less valuation allowance	Less valuation allowance	(88,293)	(87,468)
Deferred tax assets	Deferred tax assets	11,009	11,977
Less: Deferred tax liabilities	Less: Deferred tax liabilities		
Property and equipment and other	Property and equipment and other	(7,702)	(8,203)
Property and equipment and other			
Right of use operating lease assets	Right of use operating lease assets	(1,800)	(1,497)
Upfront customer consideration	Upfront customer consideration	(1,507)	(1,747)
Equity method investments			
Inventory		—	(197)
ARO, net of reimbursements		—	(333)
Total deferred tax liabilities			
Total deferred tax liabilities			
Total deferred tax liabilities	Total deferred tax liabilities	(11,009)	(11,977)
Net deferred tax assets	Net deferred tax assets	\$ —	\$ —

Accounting for income taxes requires that companies assess whether a valuation allowance should be recorded against a deferred tax asset based on an assessment of the amount of the deferred tax asset that is "more likely than not" to be

Arq, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

realized. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount that is more likely than not to be realized.

The Company assesses a valuation allowance recorded against deferred tax assets at each reporting date. The determination of whether a valuation allowance is appropriate requires the evaluation of positive and negative evidence that can be objectively verified. Consideration must be given to all sources of taxable income available to realize a deferred tax asset, including, as applicable, the future reversal of existing temporary differences, future taxable income forecasts exclusive of the reversal of temporary differences and carryforwards, taxable income in carryback years and tax planning strategies. In estimating taxes, the Company assesses the relative merits and risks of the appropriate tax treatment of transactions taking into account statutory, judicial and regulatory guidance.

As of **December 31, 2022** **December 31, 2023**, the Company concluded it is more likely than not the Company will not generate sufficient taxable income within the applicable net operating loss and tax credit carry-forward periods to realize any of its net deferred tax assets. For the year ended **December 31, 2022** **December 31, 2023**, the Company increased a valuation allowance from **December 31, 2021** **December 31, 2022** by **\$0.8 million** **\$10.5 million** and as of **December 31, 2022** **December 31, 2023**, has a valuation allowance equal to 100% of its net deferred tax assets. In reaching this conclusion, the Company primarily considered forecasts of future taxable losses.

Advanced Emissions Solutions, Inc. and Subsidiaries
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The following table presents the approximate amount of federal and state net operating loss carryforwards and federal tax credit carryforwards available to reduce future taxable income, along with the respective range of years that the net operating loss and tax credit carryforwards would expire if not utilized:

As of December 31,					As of December 31,			
		Beginning	Ending					
(in thousands)	(in thousands)	expiration	expiration	(in thousands)	2023	Beginning expiration year	Ending expiration year	
	2022	year	year					
Federal net operating loss carryforwards	\$ 467	Indefinite	Indefinite					
State and other operating loss carryforwards	\$ 2,425	2026	2037					
Federal net operating loss carryforwards (1)				Federal net operating loss carryforwards (1)	\$10,177	2035	Indefinite	
Foreign net operation loss carryforwards				Foreign net operation loss carryforwards	\$ 3,629	Indefinite		
State and other net operating loss carryforwards				State and other net operating loss carryforwards	\$ 3,211	2025	Indefinite	
Federal tax credit carryforwards	Federal tax credit carryforwards \$86,125	2032	2041	Federal tax credit carryforwards	\$86,125	2032	2041	

(1) Approximately \$8.8 million of the federal net operating loss carryforwards were acquired in the Arq Acquisition, of which \$6.2 million have expiration dates beginning in 2035.

The following table sets forth a reconciliation of the beginning and ending unrecognized tax positions on a gross basis for the years ended **December 31, 2022** **December 31, 2023** and **2021** **2022**:

Years Ended December 31,			
(in thousands)	(in thousands)	2022	2021
(in thousands)			
(in thousands)			
Balance as of January 1			
Balance as of January 1			
Balance as of January 1	Balance as of January 1	\$ 54	\$ 946

Lapse of applicable statute of limitations	Lapse of applicable statute of limitations	—	(892)
Lapse of applicable statute of limitations			
Lapse of applicable statute of limitations			
Balance as of December 31	Balance as of December 31	\$ 54	\$ 54
Balance as of December 31			
Balance as of December 31			

For the years ended **December 31, 2022** December 31, 2023 and **2021, 2022**, the Company did not record any adjustments or recognize interest expense for uncertain tax positions. Interest and penalties related to uncertain tax positions are accrued and included in the "Interest expense" line item in the Consolidated Statements of Operations. Additional information related to the components of "Interest expense" is included in Note **9, 10**.

The Company files income tax returns in the U.S., various states and various states, the United Kingdom. The Company is no longer subject to U.S. federal examinations by tax authorities for years before **2019, 2020**. The Company is generally no longer subject to state examinations by tax authorities for years before **2015, 2016**.

U.S. federal income tax rules, and Sections 382 of the Internal Revenue Code in particular, could substantially limit the use of Section 45 tax credits and other tax assets if the Company experiences an "ownership change" (as defined in the Internal Revenue Code). In general, an ownership change occurs if the aggregate stock ownership of certain stockholders (generally 5% stockholders, applying certain look-through rules) increases by more than 50 percentage points over such stockholders' lowest percentage ownership during the testing period (generally three years).

Arq, Inc. and Subsidiaries **Notes to Consolidated Financial Statements**

An entity that experiences an ownership change generally will be subject to an annual limitation on its pre-ownership change tax loss and credit carryforwards equal to the equity value of the entity immediately before the ownership change, multiplied by the long-term, tax-exempt rate posted monthly by the Internal Revenue Service (subject to certain adjustments). The annual limitation would be increased each year to the extent that there is an unused limitation in a prior year.

In connection with the Arq Acquisition and PIPE Investment, we issued additional shares of our common stock. We performed an IRC Section 382 analysis as of the Acquisition Date and determined that we had not experienced an ownership change as of that date.

The Company acquired certain tax assets (the "Legacy Arq Tax Assets") in the Arq Acquisition, totaling approximately \$12.5 million. The Legacy Arq Tax Assets are comprised of net operating loss carryforwards, of which \$8.8 million were in the U.S. Prior to the Acquisition Date, Legacy Arq completed numerous equity offerings that resulted in ownership changes. We have not completed a formal IRC Section 382 analysis of Legacy Arq equity changes from its inception through the Acquisition Date, however, the Company believes that one or more "ownership changes" occurred during this time period as defined under Sections 382 and 383 and that a portion or all the Legacy Arq Tax Assets may subject to an annual limitation.

On May 5, 2017, the Board approved the declaration of a dividend of rights to purchase Series B Junior Participating Preferred Stock for each outstanding share of common stock as part of a tax asset protection plan (the "TAPP"), which is designed to protect the Company's ability to utilize its net operating losses and tax credits. The TAPP is intended to act as a deterrent to any person acquiring beneficial ownership of 4.99% or more of the Company's outstanding common stock. During the years 2018-2023, we executed amendments to the TAPP (the "TAPP Amendments"), which amended the definition of "Final Expiration Date" under the TAPP to extend the duration of the TAPP and makes associated changes in connection therewith. The most recent TAPP Amendment was approved at our 2023 annual meeting of stockholders and extended the Final Expiration Date to the close of business on December 31, 2024.

Note 14 - Major Customers

Revenues Revenue from external customers who represent 10% or more of the Company's **revenues** revenue for the years ended **December 31, 2022** December 31, 2023 and **2021** 2022 were as follows:

Customer	Customer	Revenue Type	Years ended December 31,	
			2022	2021
Customer				
Customer				
A				
A				
A	A	Consumables	18%	14%
B	B	Consumables	11%	8%
C		Consumables	8%	10%
D		License royalties, related party	—%	14%
B				
B				

Note 15 - Related Party Transactions

Accounts Receivable

The following table shows the Company's receivable balance associated with related parties as of December 31, 2022 and 2021:

(in thousands)	As of December 31,	
	2022	2021
Receivable from related party - Tinnuum Group (1)	\$ —	\$ 2,481

(1) Represents amount due for M-45 Royalties.

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Notes to Consolidated Financial Statements

Revenues

The following table shows the income recognized with related parties during the years ended December 31, 2022 and 2021:

(in thousands)	Years Ended December 31,	
	2022	2021
License royalties, related party - Tinnuum Group	\$ —	\$ 14,368

The above Tinnuum Group royalties are included in the "License royalties, related party" line item in the Consolidated Statements of Operations.

Consumables Cost of Revenues Revenue

For the year ended December 31, 2022 December 31, 2023, the Company recognized \$0.8 \$0.7 million of Tinnuum Group Royalty expense, which is included in the "Consumables cost of revenues, revenue, exclusive of depreciation and amortization" line item in the Consolidated Statement of Operations.

Tinnuum Group Obligation

As of December 31, 2022, December 31, 2023 and 2022, the Company had an outstanding liability of \$1.7 million related to its contractual amount due under the Tinnuum Group Obligation, which is included in the "Other current liabilities" line item in the Consolidated Balance Sheet. Refer to Note 10 8 for further discussion.

Note 16 - Defined Contribution Savings Plans

The Company sponsors a qualified defined contribution savings plan (the "401(k) Plan") that allows participation by eligible employees who may defer a portion of their gross pay. The Company makes contributions to the 401(k) Plan based on percentages of an employee's eligible compensation as specified in the 401(k) Plan, and such employer contributions are in the form of cash.

Arq, Inc. and Subsidiaries

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The following table presents the amount of the Company's contributions made to the 401(k) Plans:

(in thousands)	Years Ended December 31,	
	2022	2021
401(k) Plans employer contributions	\$ 552	\$ 479

Note 17 - Subsequent Events

Unless disclosed elsewhere in the notes to the Consolidated Financial Statements, the following is the significant matter that occurred subsequent to December 31, 2022.

Acquisition

On February 1, 2023 (the "Acquisition Date"), the Company entered into a securities purchase agreement (the "Purchase Agreement") with Arq Limited ("Arq Ltd."), a company incorporated under the laws of Jersey, pursuant to which the Company acquired all of the direct and indirect equity interests of Arq Limited's subsidiaries (the "Arq Acquisition," and hereafter referred to as "Arq") in exchange for consideration (the "Purchase Consideration") totaling \$31.2 million and consisting of (i) 3,814,864 shares of the Company's common stock, par value \$0.001 per share (the "Common Stock"), valued at \$12.4 million based on the closing price of the Common Stock on the Acquisition Date and (ii) 5,294,462 shares of the Company's Series A Convertible Preferred Stock, par value \$0.001 per share (the "Series A Preferred Stock" or the "Preferred Shares"), valued at \$18.8 million. The Company also incurred \$8.7 million in acquisition-related costs, which have been expensed as incurred.

Of the total Preferred Shares, 833,914 are being held in escrow (the "Escrow Shares") based on a contingent redemption feature, (the "Contingent Redemption Feature," as defined below). The fair value of the Preferred Shares issued was determined to be \$3.46 per Preferred Share on the Acquisition Date (the "Preferred Share Price") plus the value of the Contingent Feature related to the Escrow Shares. In connection with the issuance of the Series A Preferred Stock pursuant to the Purchase Agreement, the Company filed the Certificate of Designations of Preferred Stock for the Series A Preferred Stock (the "Certificate of Designations") with the Secretary of State of the State of Delaware. Under the Certificate of Designations, 8.9 million preferred shares were designated as Series A Preferred Stock.

Years Ended December 31,

(in thousands)	2023		2022	
401(k) Plans employer contributions	\$	613	\$	552

Advanced Emissions Solutions, Inc. and Subsidiaries
Notes to Consolidated Financial Statements

Arq's principal office is located in London, United Kingdom, with additional offices located in Lexington and Corbin, Kentucky near its main production facility. Arq is an environmental technology company that has developed a process for transforming coal waste into a purified, microfine carbon powder ("Arq Powder") that can be used as an alternative to oil or in-ground mined coal to produce a range of carbon products. With the completion of the Arq Acquisition, the Company intends to first sell Arq Powder as a feedstock to produce high-quality AC for use in water and air purification markets.

Series A Preferred Stock

Each share of Series A Preferred Stock will be automatically converted into a share of Common Stock upon approval by the stockholders of the Company. Each share of Series A Preferred Stock is deemed to have an original issue price of \$4.00 per share (the "Original Issue Amount"). The number of shares of Common Stock issued upon conversion of each share of Series A Preferred Stock shall be equal to the product of (i) the sum of (A) the Original Issue Amount plus (B) an amount equal to the cumulative amount of the accrued and unpaid dividends on such share at such time divided by (ii) the Original Issue Amount, subject to adjustment.

Holders of the Series A Preferred Stock are entitled to receive cumulative dividends which will accrue quarterly on the last day of each applicable quarter (whether or not declared or funds for their payment are lawfully available) and will be payable quarterly, in arrears, on the earlier to occur of (a) the date any dividend is paid to holders of Common Stock with respect to such quarter and (b) 30 days after the end of each quarter (the "Series A Quarterly Dividend") at the rate per share of Series A Preferred Stock equal to the greater of (i) if the Company declares a cash dividend on the Common Stock with respect to such quarter, the amount of the cash dividend that would be received by a holder of Common Stock in which such share of Series A Preferred Stock would be convertible on the record date for such cash dividend and (ii) an annual rate (the "Rate") of 8.0% of the Original Issue Amount per annum compounded quarterly with respect to such quarter. The Rate will increase by 2.0% on the first day of the first quarter ending on or after the 635th day following the closing date of the first issuance of Series A Preferred Stock and on each subsequent anniversary of such date.

The Series A Quarterly Dividend is payable in cash or in additional shares of Series A Preferred Stock (the "Series A PIK Shares"), at the option of us. The number of Series A PIK Shares to be issued shall be determined by dividing (i) the Series A Quarterly Dividend payable with respect to all shares of Series A Preferred Stock held by a holder thereof by (ii) the aggregate Original Issue Amount of all shares of Series A Preferred Stock held by a holder thereof, and each fractional Series A PIK Share will be rounded to the nearest whole Series A PIK Share (with 0.5 of a share being rounded down to 0.0).

In the event of the Company's liquidation, dissolution or winding up, after payment or provision for payment of its debt and other liabilities, a holder of Series A Preferred Stock will receive a liquidating distribution equal to the amount of the cumulative accrued but unpaid dividends on each share of Series A Preferred Stock held by such holder. After the payment to the holders of Series A Preferred Stock of such liquidation preference, the holders of outstanding shares of Series A Preferred Stock will participate pari passu with the holders of Common Stock on an as-converted basis in any remaining distributions out of the Company's assets available for distribution to stockholders.

Holders of shares of Series A Preferred Stock will generally have no voting rights. However, the Company is restricted from taking certain actions without the written consent or affirmative vote of the holders of at least a majority of the then outstanding shares of Series A Preferred Stock, including, but not limited to, amending the Company's Certificate of Incorporation or Bylaws in a manner that adversely affects the rights of the Series A Preferred Stock or consummating a merger of the Company with or into another party or a sale of substantially of our assets.

If the approval by the stockholders of the Company of conversion of the Series A Preferred Stock has not been obtained, each outstanding share of Series A Preferred Stock will be redeemed by the Company on February 1, 2028 for cash, at a redemption price equal to the sum of (i) the product of (x) 140% and (y) the Original Issue Amount, plus (ii) an amount equal to the cumulative amount of accrued and unpaid dividends on such share of Series A Preferred Stock.

Acquisition Accounting

The Company accounted for the Arq Acquisition as an acquisition of a business as of the Acquisition Date. The fair value of the Purchase Consideration has been preliminarily allocated to the acquired assets and assumed liabilities based on their respective fair values as of the Acquisition Date. The Company also incurred \$8.7 million in acquisition-related costs (or transaction costs), which were expensed as incurred.

Advanced Emissions Solutions, Inc. and Subsidiaries
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Under the terms of the Purchase Agreement, the Escrow Shares are being withheld pending a determination by the IRS that no tax withholding is required on the Purchase Consideration issued to Arq Ltd. (the "Arq Ltd. Tax Liability"). The Company has estimated the fair value of the potential Arq Ltd. Tax Liability at \$3.3 million. In the event that the IRS determines that no withholding is required by Arq Ltd. in connection with the Purchase Considered received by Arq Ltd., all of the Escrow Shares will be released and delivered to Arq Ltd. In the event that the IRS determines that any amount of withholding is required by Arq Ltd., the Company has agreed to redeem a sufficient number of Escrow Shares to fund the required payment to the IRS, and that number of Escrow Shares will be returned to the Company (the "Contingent Redemption Feature"). The number of Escrow Shares to be returned to the Company is equal to the required withholding amount divided by the Original Issue Amount, not to exceed a maximum of 833,914 Escrow Shares, and is equal to \$3.3 million based on the Original Issue Amount (the "Maximum Contingent Redemption Amount"). The fair value of the Escrow Shares is the Maximum Contingent Redemption Amount and the fair value of the non-escrowed Preferred Shares ("Non Escrow Shares") is the Preferred Share Price.

The Series A Preferred Stock contains a mandatory redemption feature in the event the Series A Preferred Stock is not converted prior to February 1, 2028. The Company has determined that both the Escrow Shares and the Non Escrow Shares do not meet the definition of mandatorily redeemable financial instruments as there is a substantive conversion feature, and are therefore not classified as liabilities. As both the Escrow Shares and Non Escrow Shares represent financial instruments that are redeemable for cash, SEC

guidance mandates that preferred securities which are redeemable upon the occurrence of an event that is not solely within the control of the issuer be classified outside of permanent equity as "temporary equity." Accordingly, the Company has classified all of the Preferred Shares as temporary equity as of the Acquisition Date.

The following table provides the preliminary estimated fair values of the assets acquired and liabilities assumed as of the Acquisition Date:

(in thousands)		Preliminary Purchase Price Allocation	
Cash	\$		1,411
Inventories, net			340
Prepaid expenses and other current assets			1,889
Property, plant and equipment, net			39,199
Other long-term assets, net			19,460
Total Assets	\$		62,299
Accounts payable and accrued expenses	\$		9,323
Other current liabilities			—
Long-term debt, net of current portion			20,502
Other long-term liabilities			1,269
Total Liabilities	\$		31,094
Total Preliminary Purchase Price	\$		31,205

The intangible assets acquired are composed of Developed Technology and the estimated useful life is 10 years.

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Notes to Consolidated Financial Statements

Unaudited Pro Forma Financial Information

The following represents the pro forma effects of the Arq Acquisition as if it had occurred on January 1, 2021. The pro forma net (loss) income for each of the two years presented has been calculated after applying the Company's accounting policies in effect for those years. In addition, pro forma net (loss) income includes: (1) for the year ended December 31, 2021, an increase in Payroll and benefits for compensation expense of \$1.9 million payable to certain Arq employees triggered by change in control provisions in employment agreements as well as in employee severance agreements that is not recognized in the historical financial statements, assuming such amounts will be paid in cash; (2) for the year ended December 31, 2022, a decrease in depreciation and amortization resulting from fair value adjustments to Property, plant, equipment of \$0.9 million, and for the year ended 2021, an increase in depreciation and amortization resulting from fair value adjustments to Property, plant, equipment of \$1.1 million; (3) for each of the years ended December 31, 2022 and 2021, an increase in amortization resulting from fair value adjustments to Intangibles of \$0.8 million (4) for the year ended December 31, 2022 and 2021, increases to interest expense for: (a) the issuance of the Term Loan (as defined below) including stated interest and the amortization of the Term Loan's discount and issuance costs and (b) amortization of debt discount related to a fair value adjustment to an assumed term loan of Arq of \$2.3 million and \$2.2 million, respectively; (5) the removal of \$6.3 million of transaction costs incurred for the year ended December 31, 2022 but included as additional transaction costs for the year ended December 31, 2021; and (6) for the year ended December 31, 2021, the addition of \$5.9 million of transaction costs incurred for the period from January 1, 2023 through the Arq Acquisition Date, together with the income tax effects on (1) through (6). Since Arq had no revenues for the years ended December 31, 2022 or 2021, pro forma revenues are the same as the Company's reported revenues for those years.

(in thousands)	Years ended December 31,	
	2022	2021
Revenues	102,987	100,294
Net (loss) income	(66,297)	5,344

Subscription Agreements

As a requirement of the Purchase Agreement, and on February 1, 2023, the Company entered into subscription agreements with certain persons (the "Subscribers") pursuant to which the Subscribers subscribed for and purchased 3,842,315 shares of Common Stock for an aggregate price of \$15.4 million and at a price per share of \$4.00 ("PIPE Investment").

As a requirement of the Arq Acquisition, the Company appointed three new directors to the Board (the "New Directors"), each of whom was a director of Arq Ltd and is considered a related party as of the Acquisition Date. Each of the New Directors individually or through their affiliated entities were Subscribers in the PIPE Investment.

Loan Agreement

On August 19, 2022, the Company and CF Global Credit, LP ("CF Global") executed a commitment letter pursuant to which CF Global offered to provide a \$10 million term loan (the "Term Loan") to the Company, of which \$8.5 million was the net proceeds. The proceeds of the Term Loan are intended to be utilized for the general corporate purposes of the Company and its subsidiaries.

As a requirement of the Purchase Agreement, and on February 1, 2023 (the "Closing Date"), the Company, as borrower, certain of its subsidiaries, as guarantors, and CF Global, as administrative agent and lender, entered into the Term Loan upon execution of a Term Loan and Security Agreement (the "Loan Agreement"). Capitalized terms used herein but not

otherwise defined have the meaning set forth in the Loan Agreement. CF Global is an affiliate of one of the Company's directors who was appointed on February 1, 2023 in conjunction with the Arq Acquisition. This director is considered a related party effective February 1, 2023.

The Term Loan has a term of 48 months and bears interest at a rate equal to either (a) Adjusted Term SOFR (subject to a 1.00% floor and a cap of 2.00%) plus a margin of 9.00% paid in cash and 5.00% paid in kind or (b) Base Rate plus a margin of 8.00% paid in cash and 5.00% paid in kind, which interest on the Term Loan in each case shall be payable (or capitalized, in the case of in kind interest) quarterly in arrears.

Advanced Emissions Solutions, Inc. and Subsidiaries

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The Company is permitted to prepay the Term Loan at any time subject to the following prepayment premium: (i) prior to the twelve (12) month anniversary of the Closing Date, the Make-Whole Amount (as defined below), (ii) thereafter but prior to the thirty-six (36) month anniversary of the Closing Date, 2.00% of the outstanding principal amount of the Term Loan being repaid or prepaid or (iii) thereafter until the maturity date, 1.00% of the outstanding principal amount of the Term Loan being repaid or prepaid. The "Make-Whole Amount", with respect to any repayment or prepayment, is (i) an amount equal to all required interest payable (except for currently accrued and unpaid interest) on the aggregate principal amount of the Term Loan subject to such prepayment or repayment from the date of such prepayment or repayment through but excluding the date that is the first anniversary of the Closing Date calculated using an interest rate equal to (x) Adjusted Term SOFR for an interest period of one month in effect on the third U.S. Government Securities Business Day prior to such prepayment or repayment plus (y) 14.00% per annum and assuming all interest was paid in cash, plus (ii) a prepayment premium of 2.00% on the aggregate principal amount of the Term Loan subject to such prepayment or repayment.

The Term Loan is secured by substantially all of the assets of the Company and its subsidiaries (including those acquired in Arq Acquisition), subject to customary exceptions.

The Loan Agreement includes, among others, the following covenants: (1) beginning March 31, 2023 and as of the end of each fiscal quarter thereafter, the Company must maintain a minimum cash balance of \$5.0 million; (2) (x) as of December 31, 2023, for the fiscal year then ended, the Company must have a minimum annual revenue, on a consolidated basis, of \$70.0 million, (y) as of December 31, 2024, for the fiscal year then ended, the Company must have a minimum annual revenue, on a consolidated basis, of \$85.0 million and (z) for any fiscal year thereafter, the Company must have a minimum annual revenue, on a consolidated basis, of \$100.0 million; (3) (x) as of December 31, 2024, for the fiscal year then ended, the Company must have a minimum EBITDA of \$3.0 million and (y) for any fiscal year thereafter, the Company must have a minimum EBITDA of \$16.0 million; and (4) beginning after the fiscal quarter ending September 30, 2023, during an LTV Trigger Period, the Company must not exceed a loan to value (based on the consolidated total assets of the Company and its subsidiaries) ratio of 0.40:1.00.

In addition, in connection with the Loan Agreement and as consideration for the Term Loan, the Company agreed to issue to CF Global a warrant (the "Warrant") to purchase 325,457 shares of Common Stock. The Warrant has an exercise price of \$0.01 per share, subject to adjustment as set forth in the Warrant, is exercisable immediately and will expire on February 1, 2030. The terms of the Warrant do not allow for cash exercise, and the Warrant may only be exercised pursuant to the terms thereof.

One of the New Directors is a principal of CF Global and both this director and CF Global are considered related parties as of the Acquisition Date.

Termination of Transaction Agreement

In connection with entry into the Purchase Agreement described above, that certain Transaction Agreement, dated August 19, 2022, by and among Elbert Holdings, Inc., Arq Ltd. and the Company (the "Transaction Agreement") was terminated on February 1, 2023 pursuant to a termination agreement entered into by each of the parties to the Transaction Agreement. The Transaction Agreement would have provided, subject to its terms and conditions, for a business combination of Arq Ltd. and the Company. By virtue of the termination of the Transaction Agreement, the Transaction Agreement became void and of no further force or effect, with no liability of the part of any party to the Transaction Agreement.

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure

None.

Item 9A. Controls and Procedures

Evaluation of Disclosure Controls and Procedures

As required by Rule 13a-15(b) under the Securities Exchange Act of 1934, as amended (the "Exchange Act"), we have evaluated, under the supervision of and with the participation of our management, including our principal executive officer and principal financial officer, the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this annual report. Our disclosure controls and procedures are designed to ensure that information required to be disclosed in the reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported, within the time periods specified in the SEC's rules and forms. Based upon this evaluation, our principal executive officer and principal financial officer concluded that our disclosure controls and procedures were effective as of **December 31, 2022** **December 31, 2023**.

Management's Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Internal control over financial reporting is designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of consolidated financial statements for external purposes in accordance with generally accepted accounting principles. The Company's internal control over financial reporting includes those policies and procedures that:

1. Pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets;
2. Provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Company are being made only in accordance with authorizations of our management and directors; and
3. Provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of the Company's assets that could have a material effect on our financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Under the supervision of, and with the participation of our management, including the principal executive officer and principal financial officer, we conducted an evaluation of the effectiveness of our internal control over financial reporting based on the framework and criteria established in *Internal Control-Integrated Framework* in 2013, issued by the Committee of Sponsoring Organizations of the Treadway Commission. Based on this evaluation, our management concluded that our internal control over financial reporting was effective as of **December 31, 2022** **December 31, 2023**.

Remediation Efforts RelatedWe acquired Legacy Arq during the first quarter of 2023 (refer to **Past Material Weaknesses**

Item 8. Note 2 of this Report). As reported in Item 9A permitted by Securities and Exchange Commission Staff interpretive guidance for newly acquired businesses, management excluded Legacy Arq from its evaluation of Annual Report on Form 10-K for the fiscal year ended December 31, 2021, we identified deficiencies in the design and operation of controls over (1) the selection and application of accounting principles; (2) the monitoring of interpretative guidance of previously adopted accounting standards; and (3) the annual review of policies and procedures related to material accounts. These deficiencies in combination were evaluated as having a reasonable possibility that a material misstatement would not be prevented or detected on a timely basis resulting in a material weakness in our internal controls.

As of December 31, 2022, we have implemented additional processes and procedures for the monitoring of interpretative guidance on previously adopted accounting standards and our annual review of policies and process narratives related to material financial statement components that have been deemed effective for the fiscal year ended December 31, 2022.

Moss Adams LLP, an independent registered public accounting firm, has issued an attestation report on our internal control over financial reporting as of **December 31, 2022** **December 31, 2023**. We are in the process of documenting and its testing Legacy Arq's internal controls over financial reporting. We will incorporate Legacy Arq into our annual report is included herein.

on internal control over financial reporting for our year ending December 31, 2024. As of December 31, 2023, Legacy Arq net assets totaled \$40.5 million. Legacy Arq contributed \$11.7 million of net loss in our Consolidated Statements of Operations for the year ended December 31, 2023.

Changes in Internal Control Over Financial Reporting

There has been no change in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) during the fourth quarter of **2022** **2023** that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of
Advanced Emissions Solutions, Inc.

Opinion on Internal Control over Financial Reporting

We have audited Advanced Emissions Solutions, Inc. and subsidiaries' (the "Company") internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control - Integrated Framework*(2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission ("COSO"). In our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control - Integrated Framework* (2013) issued by COSO.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) ("PCAOB"), the consolidated balance sheets of Advanced Emissions Solutions, Inc. and subsidiaries as of December 31, 2022 and 2021, the related consolidated statements of operations, changes in stockholders' equity and cash flows for the years then ended, and the related notes (collectively referred to as the "consolidated financial statements") and our report dated March 8, 2023 expressed an unqualified opinion on those consolidated financial statements.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management Report on Internal Control over Financial Reporting included in Item 9A. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control Over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may

deteriorate.

/s/ Moss Adams LLP

Denver, Colorado

March 8, 2023

We have served as the Company's auditor since 2017.

Item 9B. Other Information

None.

Item 9C. Disclosure Regarding Foreign Jurisdictions that Prevent Inspections

None.

PART III

Item 10. Directors, Executive Officers, and Corporate Governance

The information required by this Item is incorporated by reference to our definitive proxy statement for the Annual Meeting of Stockholders to be filed within 120 days from December 31, 2022 December 31, 2023.

Item 11. Executive Compensation

The information required by this Item is incorporated by reference to our definitive proxy statement for the Annual Meeting of Stockholders to be filed within 120 days from December 31, 2022 December 31, 2023.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters

The information required by this Item concerning security ownership of certain beneficial owners and management is incorporated by reference to our definitive proxy statement for the Annual Meeting of Stockholders to be filed within 120 days from December 31, 2022 December 31, 2023, with the exception of the following information.

Securities Authorized for Issuance under Equity Compensation Plans

We have plans under which equity awards are authorized for grant or issuance as compensation to eligible employees, consultants, and members of the Board. Our stockholders have approved these plans. See Note 12 - Stock-Based Compensation included in Item 8 of this Report for further information about the material terms of our equity compensation plans. The following table is a summary of the shares of our common stock authorized for issuance under the equity compensation plans as of December 31, 2022 December 31, 2023:

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in the first column) (2)
Equity compensation plans approved by security holders (1)	—	\$ —	1,403,043
Equity compensation plans not approved by security holders	—	\$ —	—
Total	—	\$ —	1,403,043

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights	Weighted-average exercise price of outstanding options, warrants and rights	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in the first column)
Equity compensation plans approved by security holders (1)	— (2)	\$ 3.00 (3)	190,281
Equity compensation plans not approved by security holders	—	\$ —	—
Total	—	\$ —	190,281

(1) Includes securities registered for issuance under the 2017 Omnibus Incentive Plan and 2022 Omnibus Incentive Plan.

(2) Of these shares, 1,000,000 were subject to non-qualified stock options, 790,005 were subject to unvested restricted stock awards and 968,918 were subject to unvested performance share units.

(3) The number restricted shares and RSUs were granted at full value, and therefore, have a weighted-average exercise price of securities is reduced by 652,962 \$0. Excluding restricted shares and PSUs from this calculation, the weighted-average exercise price of restricted common outstanding non-qualified stock for which restrictions have not lapsed, options was \$3.00 at December 31, 2023.

Item 13. Certain Relationships and Related Transactions and Director Independence

The information required by this Item is incorporated by reference to our definitive proxy statement for the Annual Meeting of Stockholders to be filed within 120 days from December 31, 2022 December 31, 2023.

Item 14. Principal Accountant Fees and Services

The information required by this Item is incorporated by reference to our definitive proxy statement for the Annual Meeting of Stockholders to be filed within 120 days from **December 31, 2022** **December 31, 2023**.

PART IV

Item 15. Exhibits and Financial Statement Schedules

(a) The following consolidated financial statements of **Advanced Emissions Solutions, Arq, Inc.** are filed as part of this Report under Item 8:

- (1) Financial Statements – see Index to Consolidated Financial Statements in Item 8;
- (2) Financial Statement Schedules – All schedules are omitted because the required information is not applicable or is not present in amounts sufficient to require submission of the schedule or because the information required is included in the Consolidated Financial Statements and Notes thereto; and
- (3) Exhibits – Those exhibits required by Item 601 of Regulation S-K and by paragraph (b) below.

(b) The following exhibits are filed as part of this Report or, where indicated, were heretofore filed and are hereby incorporated by reference:

Exhibit No.	Exhibit No.	Description	Form	Incorporated by			Exhibit No.	Description	Form	Incorporated by			Filing Date
				File No.	Reference Exhibit	Filing Date				File No.	Reference Exhibit	Filing Date	
3.1	3.1	Second Amended and Restated Certificate of Incorporation of Advanced Emissions Solutions, Inc.	10-Q	000-54992	3.1	August 9, 2013	3.1	Second Amended and Restated Certificate of Incorporation of Advanced Emissions Solutions, Inc.	10-Q	000-54992	3.1		August 9, 2013
3.2	3.2	Conformed Copy of the Bylaws of Advanced Emissions Solutions, Inc., as amended	10-K	001-37822	3.2	March 12, 2018	3.2	Certificate of Amendment to the Amended and Restated Certificate of Incorporation, effective February 1, 2024	8-K	001-37822	3.1		January 31, 2024
3.3	3.3	Certificate of Designation, Preferences, and Rights of Series B Junior Participating Preferred Stock of Advanced Emissions Solutions, Inc.	8-K	001-37822	3.1	May 8, 2017	3.3	Certificate of Designation, Preferences, and Rights of Series B Junior Participating Preferred Stock of Advanced Emissions Solutions, Inc.	8-K	001-37822	3.1		May 8, 2017
3.4	3.4	Certificate of Designations of Series A Preferred Stock	8-K	001-37822	3.1	February 1, 2023	3.4	Certificate of Designations of Series A Preferred Stock	8-K	001-37822	3.1		February 1, 2023
3.5							3.5	Amended and Restated Bylaws, effective February 1, 2024	8-K	001-37822	3.2		January 31, 2024
4.1	4.1	Form of Specimen Common Stock Certificate	10-Q	000-54992	4.1	August 9, 2013	4.1	Form of Specimen Common Stock Certificate	10-Q	000-54992	4.1		August 9, 2013

4.2	4.2	Tax Asset Protection Plan dated as of May 5, 2017, by and between the Company and Computershare Trust Company, N.A., as rights agent, which includes as Exhibit B the Form of Rights Certificate	8-K	001-37822	3.2	May 8, 2017	4.2	Tax Asset Protection Plan dated as of May 5, 2017, by and between the Company and Computershare Trust Company, N.A., as rights agent, which includes as Exhibit B the Form of Rights Certificate	8-K	001-37822	3.2	May 8, 2017
4.3	4.3	First Amendment to Tax Asset Protection Plan dated as of April 6, 2018, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.2	April 11, 2018	4.3	First Amendment to Tax Asset Protection Plan dated as of April 6, 2018, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.2	April 11, 2018
4.4	4.4	Second Amendment to Tax Asset Protection Plan dated as of April 5, 2019, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.3	April 11, 2019	4.4	Second Amendment to Tax Asset Protection Plan dated as of April 5, 2019, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.3	April 11, 2019
4.5	4.5	Third Amendment to Tax Asset Protection Plan dated as of April 8, 2020, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.4	April 9, 2020	4.5	Third Amendment to Tax Asset Protection Plan dated as of April 8, 2020, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.4	April 9, 2020

4.6	4.6	Fourth Amendment to Tax Asset Protection Plan dated as of April 9, 2021, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.5	April 13, 2021	4.6	Fourth Amendment to Tax Asset Protection Plan dated as of April 9, 2021, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.5	April 13, 2021	
4.7	4.7	Fifth Amendment to Tax Asset Protection Plan dated as of March 15, 2022, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.6	March 16, 2022	4.7	Fifth Amendment to Tax Asset Protection Plan dated as of March 15, 2022, by and between the Company and Computershare Trust Company, N.A., as rights agent	8-K	001-37822	4.6	March 16, 2022	
4.8	4.8	Form of Warrant	8-K	001-37822	4.1	February 1, 2023	4.8	Sixth Amendment to Tax Asset Protection Plan dated as of April 13, 2023, by and between the Company and Computershare Trust Company, N.A., as rights agent.	8-K	001-37822	4.7	April 14, 2023	
4.9							4.9	Form of Warrant	8-K	001-37822	4.1	February 1, 2023	
4.10													
10.1	10.1	Advanced Emissions Solutions, Inc. 2017 Omnibus Incentive Plan**	8-K	001-37822	10.1	June 22, 2017							
10.1	10.1								Advanced Emissions Solutions, Inc. 2017 Omnibus Incentive Plan**				
10.2	10.2	Advanced Emissions Solutions, Inc. 2022 Omnibus Incentive Plan**	8-K	001-37822	10.1	May 17, 2022	10.2	Advanced Emissions Solutions, Inc. 2022 Omnibus Incentive Plan**	8-K	001-37822	10.1	May 17, 2022	

10.3	10.3	Rider to Employment Agreement dated August 27, 2014 between Heath Sampson and ADA-ES, Inc. and Advanced Emissions Solutions, Inc.**	8-K	000-54992	10.66	September 2, 2014
10.4	10.4	Form of Amendment No. 2 to Employment Agreement of Greg Marken**	10-Q	001-37822	10.1	August 6, 2018
10.5	10.5	Release of Claims and Separation Agreement dated as of June 30, 2020, between the Company and Heath Sampson	10-Q	001-37822	10.3	August 10, 2020

Exhibit No.	Exhibit No.	Description	Form	File No.	Reference Exhibit	Filing Date	Exhibit No.	Description	Form	File No.	Reference Exhibit	Filing Date
10.4	10.4											
10.5	10.5											
10.5	10.5											
10.5	10.5							Form of Amendment No. 2 to Employment Agreement of Greg Marken**	10-Q	001-37822	10.1	August 6, 2018
10.6	10.6	Advisor Services Agreement dated as of July 1, 2020, between the Company and Heath Sampson	10-Q	001-37822	10.4	August 10, 2020	10.6	Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC dated May 27, 2011, by and among Clean Coal Solutions, LLC, ADA-ES, Inc., GSFS Investments I Corp. and NexGen Refined Coal, LLC***	10-Q/A	000-50216	10.33	September 28, 2011
10.7	10.7	Employment Agreement dated February 26, 2021 between the Company and Morgan Fields**, ***	8-K	001-37822	10.1	March 3, 2021	10.7	The First Amendment to the Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC, by and among Clean Coal Solutions, LLC, ADA-ES, Inc., GSFS Investments I Corp. and NexGen Refined Coal, LLC dated September 9, 2011	10-Q	000-50216	10.89	November 14, 2011

10.8	10.8	Form of Retention Agreement dated May 5, 2021 of Greg Marken and Morgan Fields**, ***	10-Q	001-37822	10.4	May 10, 2021	10.8	Second Amendment to the Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC by and among ADA-ES, Inc., NexGen Refined Coal, LLC and GSFS Investments I Corp. dated July 31, 2012	10-Q	000-50216	10.59	November 9, 2012
10.9	10.9	Retention Agreement dated May 5, 2021 between the Company and Joe Wong**, ***	10-Q	001-37822	10.5	May 10, 2021	10.9	Contribution Agreement dated May 27, 2011 between ADA-ES, Inc. and NexGen Refined Coal, LLC	10-Q	000-50216	10.87	August 12, 2011
10.10	10.10	Form of Amended Retention Agreement dated May 8, 2022 of Greg Marken, Morgan Fields and Joe Wong**	10-Q	001-37822	10.1	May 9, 2022	10.10	Amended and Restated Limited Liability Company Operating Agreement by and between ADA-ES, Inc., NexGen Refined Coal, LLC and Clean Coal Solutions Services, LLC dated November 20, 2013	10-K	000-54992	10.38	February 29, 2016
10.11	10.11	Employment Agreement dated May 7, 2020, between the Company and Christine Bellino**, ***	8-K	001-37822	10.1	May 11, 2020	10.11	Amended and Restated License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated October 30, 2009	10-Q	000-50216	10.77	August 16, 2010

10.12	10.12	Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC dated May 27, 2011, by and among Clean Coal Solutions, LLC, ADA-ES, Inc., GSFS Investments I Corp. and NexGen Refined Coal, LLC**	10-Q/A	000-50216	10.33	September 28, 2011	10.12	First Amendment to the Amended and Restated License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated as of August 4, 2010	10-K	000-50216	10.81	March 28, 2011
10.13	10.13	The First Amendment to the Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC, by and among Clean Coal Solutions, LLC, ADA-ES, Inc., GSFS Investments I Corp. and NexGen Refined Coal, LLC dated September 9, 2011	10-Q	000-50216	10.89	November 14, 2011	10.13	Second Amendment to Amended and Restated License Agreement by and between ADA-ES, Inc. and Clean Coal Solutions, LLC dated as of July 23, 2013***	10-Q	000-54992	10.63	November 12, 2013

10.14	10.14	Second Amendment to the Second Amended and Restated Operating Agreement of Clean Coal Solutions, LLC by and among ADA-ES, Inc., NexGen Refined Coal, LLC and GSFS Investments I Corp. dated July 31, 2012	10-Q	000-50216	10.59	November 9, 2012	10.14	Technology Sublicense Agreement between ADA-ES, Inc., Clean Coal Solutions, LLC, and GS RC Investments LLC dated June 29, 2010	10-Q	000-50216	10.74	August 16, 2010
10.15	10.15	Contribution Agreement dated May 27, 2011 between ADA-ES, Inc. and NexGen Refined Coal, LLC	10-Q	000-50216	10.87	August 12, 2011	10.15	Amendment to Technology Sublicense Agreement between ADA-ES, Inc., GS RC Investments, LLC, and Clean Coal Solutions, LLC dated November 21, 2011***	10-K	000-54992	10.44	February 29, 2016
10.16	10.16	Amended and Restated Limited Liability Company Operating Agreement by and between ADA-ES, Inc., NexGen Refined Coal, LLC and Clean Coal Solutions Services, LLC dated November 20, 2013	10-K	000-54992	10.38	February 29, 2016	10.16	Amendment #2 to Technology Sublicense Agreement between ADE-ES, Inc, GS RC Investments, LLC, and Clean Coal Solutions, LLC dated December 15, 2011	10-K	000-50216	10.49	March 15, 2012

10.17	10.17	Amended and Restated License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated October 30, 2009	10-Q 000-50216	10.77	August 16, 2010	10.17	M-45 Technology License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated July 27, 2012***	10-Q 000-50216	10.58	November 9, 2012
10.18		First Amendment to the Amended and Restated License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated as of August 4, 2010	10-K 000-50216	10.81	March 28, 2011					
10.19		Second Amendment to Amended and Restated License Agreement by and between ADA-ES, Inc. and Clean Coal Solutions, LLC dated as of July 23, 2013***	10-Q 000-54992	10.63	November 12, 2013					
10.20		Technology Sublicense Agreement between ADA-ES, Inc., Clean Coal Solutions, LLC, and GS RC Investments LLC dated June 29, 2010	10-Q 000-50216	10.74	August 16, 2010					

10.21	Amendment to Technology Sublicense Agreement between ADA-ES, Inc., GS RC Investments, LLC, and Clean Coal Solutions, LLC dated November 21, 2011***	10-K	000-54992	10.44	February 29, 2016
10.22	Amendment #2 to Technology Sublicense Agreement between ADE-ES, Inc., GS RC Investments, LLC, and Clean Coal Solutions, LLC dated December 15, 2011	10-K	000-50216	10.49	March 15, 2012
10.23	M-45 Technology License Agreement between ADA-ES, Inc. and Clean Coal Solutions, LLC dated July 27, 2012***	10-Q	000-50216	10.58	November 9, 2012
10.24	Lignite Mining Agreement between Demery Resources Company, L.L.C. and Five Forks Mining, LLC dated as of June 29, 2009***	10-K	001-37822	10.43	March 18, 2019

10.25	First Amendment to Lignite Mining Agreement between Demery Resources Company, L.L.C. and Five Forks Mining, LLC, dated as of March 22, 2017***	10-K	001-37822	10.44	March 18, 2019								
10.18													
10.18													
10.18	Lignite Mining Agreement between Demery Resources Company, L.L.C. and Five Forks Mining, LLC dated as of June 29, 2009***	10-K	001-37822	10.43	March 18, 2019								
10.19	First Amendment to Lignite Mining Agreement between Demery Resources Company, L.L.C. and Five Forks Mining, LLC, dated as of March 22, 2017***	10-K	001-37822	10.44	March 18, 2019								
10.20	Third Amendment to the Second Amended and Restated Operating Agreement of Tinuum Group, LLC, dated September 4, 2019***	10-Q	001-37822	10.1	November 12, 2019								
10.21													
10.21													
10.21	Master Agreement for Supply of Furnace Products between ADA Carbon Solutions, LLC and Cabot Norit Americas, Inc. ***	8-K	001-37822	10.1	September 30, 2020								

Exhibit No.	Exhibit No.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date	Exhibit No.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date
10.22		Membership Interest Purchase Agreement between Caddo Creek Resources Company, L.L.C., as Buyer, and ADA Carbon Solutions (Operations), LLC, as Seller dated as of September 2, 2022***	8-K	001-37822		10.2						September 6, 2022
10.23												
10.23												
10.23		Securities Purchase Agreement, dated as of February 1, 2023, by and among Advanced Emissions Solutions, Inc. and Arg Limited***	8-K	001-37822		2.1						February 1, 2023
10.24		Registration Rights Agreement***	8-K	001-37822		10.1						February 1, 2023
10.25		Term Loan and Security Agreement among Advanced Emissions Solutions, Inc., as Debtor, Certain Subsidiaries of Debtor, as Guarantors, CF Global Credit LP, as Administrative Agent, and the Lenders, from time to time party hereto, dated as of February 1, 2023***	8-K	001-37822		10.2						February 1, 2023
10.26	10.26	Third Amendment to the Second Amended and Restated Operating Agreement of Tinuum Group, LLC, dated September 4, 2019***	10-Q	001-37822	10.1	November 12, 2019	10.26	Loan Agreement among Community Trust Bank, Inc.; Corbin Project LLC, Arg Projects Holding Company LLC, Arg St. Rose LLC, Arg Corbin LLC and Arg Corbin Land LLC, dated January 27, 2021†	10-K	001-37822	10.35	March 8, 2023

10.27	10.27	Master Agreement for Supply of Furnace Products between ADA Carbon Solutions, LLC and Cabot Norit Americas, Inc.***	8-K	001-37822	10.1	September 30, 2020	10.27	Loan Modification Agreement among Community Trust Bank, Inc.; Corbin Project LLC, Arg Projects Holding Company LLC, Arg St. Rose LLC, Arg Corbin LLC and Arg Corbin Land LLC, dated as of June 2, 2023	8-K	001-37822	10.1	June 6, 2023
10.28	10.28	Amended and Restated Lignite Mining Agreement among Caddo Creek Resources Company, L.L.C., ADA Carbon Solutions (Operations), LLC, Marshall Mine, LLC and The North American Coal Corporation dated as of September 30, 2020***	8-K	001-37822	10.2	September 30, 2020	10.28	Employment Agreement by and between Robert E. Rasmus and Advanced Emissions Solutions, Inc., dated July 17, 2023	8-K	001-37822	10.2	July 17, 2023
10.29	10.29	Membership Interest Purchase Agreement between Caddo Creek Resources Company, L.L.C., as Buyer, and ADA Carbon Solutions (Operations), LLC, as Seller dated as of September 2, 2022***	8-K	001-37822	10.2	September 6, 2022	10.29	Subscription Agreement by and between Robert E. Rasmus, RER Legacy Investments II LLC and Advanced Emissions Solutions, Inc., dated July 17, 2023	8-K	001-37822	10.1	July 17, 2023

10.3	Fifteenth Amendment of 2013 Loan and Security Agreement by and among ADA-ES Inc., Advanced Emissions Solutions, Inc., and BOK, NA d/b/a Bank of Oklahoma dated as of March 23, 2021	8-K	001-37822	10.1	March 29, 2021								
10.30													
10.31													
10.31													
10.31	10.31	Sixteenth Amendment of 2013 Loan and Security Agreement by and among ADA-ES Inc., Advanced Emissions Solutions, Inc., and BOK, NA d/b/a Bank of Oklahoma dated as of July 29, 2021	8-K	001-37822	10.1	July 29, 2021	Employment Agreement by and between Jeremy D. Williamson and Advanced Emissions Solutions, Inc., dated September 18, 2023		8-K	001-37822	10.3	September 18, 2023	
10.32	10.32	Securities Purchase Agreement, dated as of February 1, 2023, by and among Advanced Emissions Solutions, Inc. and Arg Limited***	8-K	001-37822	2.1	February 1, 2023	Employment Agreement by and between Stacia Hansen and Advanced Emissions Solutions, Inc., dated November 6, 2023		8-K	001-37822	10.1	November 8, 2023	
10.33		Registration Rights Agreement***	8-K	001-37822	10.1	February 1, 2023							

10.34	Term Loan and Security Agreement among Advanced Emissions Solutions, Inc., as Debtor, Certain Subsidiaries of Debtor, as Guarantors, CF Global Credit LP, as Administrative Agent, and the Lenders, from time to time party hereto, dated as of February 1, 2023***	8-K	001-37822	10.2	February 1, 2023
10.35	Loan Agreement among Community Trust Bank, Inc., Corbin Project LLC, Arg Projects Holding Company LLC, Arg St. Rose LLC, Arg Corbin LLC and Arg Corbin Land LLC, dated January 27, 2021*,†				
21.1	21.1 Subsidiaries of Advanced Emissions Solutions, Inc.*				
21.1					
23.1					
23.1					
23.1	23.1 Consent of Moss Adams LLP*				

31.1 31.1 [Certification of Principal Executive Officer of Advanced Emissions Solutions, Inc. Pursuant to 17 CFR 240.13a-14\(a\) or 17 CFR 240.15d-14\(a\)*](#)

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31.2

31.2 31.2 [Certification of Principal Financial Officer of Advanced Emissions Solutions, Inc. Pursuant to 17 CFR 240.13a-14\(a\) or 17 CFR 240.15d-14\(a\)*](#)

32.1 32.1 [Certification of Principal Executive Officer and Principal Financial Officer of Advanced Emissions Solutions, Inc. Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002*](#)

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				Incorporated by	
				Reference	
Exhibit No.	Description	Form	File No.	Exhibit	Filing Date
95 97	Mine Safety Disclosure Exhibit Clawback Policy*				

- 101 The following financial statements, formatted in XBRL: (i) Consolidated Balance Sheets as of December 31, 2022 December 31, 2023 and 2021, 2022, (ii) Consolidated Statements of Operations for the Years ended December 31, 2022 December 31, 2023 and 2021, 2022, (iii) Consolidated Statements of Changes in Stockholders' Equity for the Years ended December 31, 2022 December 31, 2023 and 2021, 2022, (iv) Consolidated Statements of Cash Flows for the Years ended December 31, 2022 December 31, 2023 and 2021, 2022; and (v) Notes to the Consolidated Financial Statements. The information in Exhibit 101 is "furnished" and not "filed" as provided in Rule 401 of Regulation S-T.

Notes:

- * – Filed herewith.
- ** – Management contract or compensatory plan or arrangement.
- *** – Portions of this exhibit have been omitted pursuant to a request for Item 601(b)(10) as information that the Company customarily and actually treats that information as private or confidential treatment, and is not material.
- † – Schedules and exhibits have been omitted pursuant to Item 601(a)(5) of Regulation S-K. The Company hereby undertakes to furnish supplemental copies of any of the omitted schedules and exhibits upon request by the SEC.

Filings for the Company were made under the name ADA-ES, Inc. (File No. 000-50216) prior to July 1, 2013, the effective date of our reorganization, and under the name Advanced Emissions Solutions, Inc. (File No. 000-54992) starting on July 1, 2013. Filings for the Company were made under the name Advanced Emissions Solutions, Inc. (File No. 001-37822) starting on July 6, 2016. On February 1, 2024, the Company changed its name to Arq, Inc.

(c) Financial Statement Schedules. Please refer to Item 15(a) above.

Item 16. Form 10-K Summary

None.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Exchange Act, the Registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

Advanced Emissions Solutions, Arq, Inc.
(Registrant)

By /s/ Greg P. Marken Robert Rasmus

Greg P. Marken Robert Rasmus

Chief Executive Officer (Principal Executive Officer)

Date: March 8, 2023 March 12, 2024

By /s/ Morgan Fields Stacia Hansen

Morgan Fields Stacia Hansen

Chief Accounting Officer (Principal Financial and Accounting Officer)

Date: March 8, 2023 March 12, 2024

Pursuant to the requirements of the Exchange Act, this report has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated.

By /s/ Richard Campbell-Breeden
Richard Campbell-Breeden, Director
Date: March 12, 2024

By /s/ Carol Eicher
Carol Eicher, Director
Date: March 12, 2024

By /s/ Julian McIntyre
Julian McIntyre, Director
Date: March 12, 2024

By /s/ L. Spencer Wells
L. Spencer Wells, Director
Date: March 12, 2024

By /s/ Jeremy Blank
Jeremy Blank, Director
Date: March 12, 2024

By /s/ Gilbert Li
Gilbert Li, Director
Date: March 12, 2024

By /s/ Laurie Bergman
Laurie Bergman, Director
Date: March 12, 2024

By /s/ Robert Rasmus
Robert Rasmus, Director
Date: March 12, 2024

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Exhibit 4.10

DESCRIPTION OF REGISTRANT SECURITIES

The following descriptions of our capital stock and certain provisions of our second amended and restated certificate of incorporation, our bylaws, as amended, and our Tax Asset Protection Plan (as defined below), as amended, are summaries and are qualified by reference to our second amended and restated certificate of incorporation and bylaws.

Our authorized capital stock consists of 150,000,000 shares of capital stock, par value \$0.001 per share, of which:

- 100,000,000 shares are designated as common stock; and
- 50,000,000 shares are designated as preferred stock.

Common Stock

As of December 31, 2023, we had 33,172,938 shares of common stock issued and outstanding.

Voting Rights

Each holder of common stock is entitled to one vote for each share on all matters submitted to a vote of the stockholders. Our second amended and restated certificate of incorporation does not provide for cumulative voting rights. Our bylaws provide that the election of any director and proposals designated by the directors will be decided by a plurality of the votes cast at a meeting of the stockholders by the holders of stock entitled to vote in the election. With respect to matters other than the election of directors and proposals designated by the director as being subject to a plurality vote, such matters shall be approved if the votes cast favoring the matter exceed the votes cast opposing the matter at a meeting of the stockholders by the holders of stock entitled to vote. The holders of one-third of the voting power of the outstanding shares of Common Stock entitled to vote at the meeting, present in person or represented by proxy, shall constitute a quorum for the transaction of business at all meetings of the stockholders.

Dividends

Our bylaws provide that, subject to applicable law, dividends upon shares of our capital stock may be declared by the board of directors and may be paid in cash, in property or in shares of our capital stock, unless otherwise provided by applicable law.

Liquidation

In the event of our liquidation, dissolution or winding up, whether voluntary or involuntary, after payment or provision for payment of our debts and other liabilities and the preferential amounts to which the holders of any outstanding shares of preferred stock are entitled to receive on dissolution, liquidation, or winding up, the holders of the common stock are entitled to share on a pro rata basis in our remaining assets.

Rights and Preferences

Holders of our common stock have no preemptive, conversion, subscription or other rights, and there are no redemption or sinking fund provisions applicable to our common stock. The rights, preferences and privileges of the holders of our common stock are subject to and may be adversely affected by the rights of the holders of shares of any series of our preferred stock that we may designate in the future.

Fully Paid and Nonassessable

All of our outstanding shares of common stock are fully paid and nonassessable.

Preferred Stock

As of December 29, 2023, there were no shares of preferred stock outstanding. We previously designated 8,900,000 shares as Series A Convertible Preferred, and issued 5,294,462 shares. All were subsequently converted in Common Stock. We also have 50,000 shares of Series B Junior Participating Preferred Stock, par value \$0.001 per share, authorized and reserved for issuance upon the exercise of the Rights (as defined below) under our Tax Asset Protection Plan, as described below.

Our second amended and restated certificate of incorporation provides that our board of directors has the authority, subject to limitations prescribed by Delaware law, to issue preferred stock in one or more series, to establish from time to time the number of shares to be included in each series, and to fix the designation, powers, preferences, and rights of the shares of each series and any of its qualifications, limitations, or restrictions, in each case without further vote or action by our stockholders. Our board of directors also has the authority to increase or decrease the number of shares of any series of preferred stock, but not below the number of shares of that series then outstanding, without any further vote or action by our stockholders. Our board of directors may authorize the issuance of preferred stock with voting or conversion rights that could adversely affect the voting power or other rights of the holders of our common stock. The issuance of preferred stock, while providing flexibility in connection with possible acquisitions and other corporate purposes, could, among other things, have the effect of delaying, deferring, or preventing a change in control of our company and might adversely affect the market price of our common stock and the voting and other rights of the holders of our common stock. We have no current plan to issue any shares of preferred stock.

Anti-Takeover Provisions

Certain provisions of Delaware law, and our amended and restated certificate of incorporation and amended and restated bylaws, which are summarized below, may have the effect of delaying, deferring, or discouraging another person from acquiring control of us. They are also designed, in part, to encourage persons seeking to acquire control of us to negotiate first with our board of directors. We believe that the benefits of increased protection of our potential ability to negotiate with an unfriendly or unsolicited acquirer outweigh the disadvantages of discouraging a proposal to acquire us because negotiation of these proposals could result in an improvement of their terms.

Delaware Takeover Statute and Certain Business Combinations

We have elected not to be governed by the provisions of Section 203 of the DGCL. In general, Section 203 prohibits a public Delaware corporation from engaging in a "business combination" with an "interested stockholder" for a period of three years after the date of the transaction in which the person became an interested stockholder, subject to certain exceptions. Our second amended and restated certificate of incorporation includes provisions requiring certain business combinations to be approved by the affirmative vote of the holders of at least a majority of the voting power of the then outstanding voting stock, voting together as a single class, including the affirmative vote of the holders of at least a majority of the voting power of the then outstanding voting stock not owned directly or indirectly by any interested stockholder (i.e. a person who owns 10% or more of our outstanding voting stock) or any affiliate of an interested stockholder. Subject to some exceptions set forth in the second amended and restated certificate of incorporation, such affirmative vote shall be required notwithstanding the fact that no vote may be required, or that a lesser percentage may be permitted, by applicable law or in any agreement with any national securities exchange or otherwise.

Removal of Directors; Vacancies.

The DGCL provides that a director may be removed, with or without cause, by the holders of a majority of the shares entitled to vote at an election of directors. Our bylaws provide that newly created directorships resulting from an increase in the authorized number of directors and any vacancies occurring in the board of directors, may be filled by the affirmative votes of a majority of the remaining members of the board of directors, although less than a quorum. A director so elected shall hold office until the earlier of the expiration of the term of office of the director whom he or she has replaced, a successor is duly elected and qualified or the earlier of such director's death, resignation or removal.

No Cumulative Voting. The DGCL provides that stockholders are not entitled to cumulate votes in the election of directors unless a corporation's certificate of incorporation provides otherwise. Our second amended and restated certificate of incorporation does not provide for cumulative voting.

Stockholder Meetings; Requirements for Advance Notice. Our bylaws provide that special meetings of stockholders for any purpose or purposes may be called pursuant to a resolution approved by the board of directors or by the holders of shares entitled to cast not less than 20% of the votes at the meeting, and shall be held at such place, on such date, and at such time as the board of directors shall fix. Our bylaws provide that notice of the place, if any, date, hour, the record date for determining the stockholders entitled to vote at the meeting (if such date is different from the record date for stockholders entitled to notice of the meeting) and means of remote communication, if any, of every meeting of stockholders shall be given not less than ten days nor more than 60 days before such meeting (unless a different time is specified by law) to every stockholder entitled to

vote at the meeting as of the record date for determining the stockholders entitled to notice of the meeting and that notices of special meetings shall also specify the purpose or purposes for which the meeting has been called.

Authorized but Unissued Shares. Our authorized but unissued shares of common stock and preferred stock will be available for future issuances without stockholder approval, except as required by the listing standards of Nasdaq, and could be utilized for a variety of corporate purposes, including future offerings to raise additional capital, acquisitions and employee benefit plans. The existence of authorized but unissued and unreserved common stock and preferred stock could render more difficult or discourage an attempt to obtain control of the company by means of a proxy contest, tender offer, merger or otherwise.

Tax Asset Protection Plan. On May 5, 2017, our board of directors approved the Tax Asset Protection Plan (the "Original TAPP", and as amended up to the date of this disclosure, the "TAPP") and declared a dividend of one preferred share purchase right (each, a "Right") for each outstanding share of our common stock. During the years 2018-2023, we executed amendments to the TAPP (the "TAPP Amendments"), which extend the duration of the TAPP to a later "Final Expiration Date" and make associated changes in connection therewith. The most recent TAPP Amendment was approved at our 2023 annual meeting of stockholders and extended the Final Expiration Date to the close of business on December 31, 2024.

Subject to the terms, provisions and conditions of the TAPP, if the Rights become exercisable, each Right would initially represent the right to purchase one ten-thousandth of a shares of our Series B Junior Participating Preferred Stock, par value \$0.001 per share, for a purchase price of \$50.00, subject to certain adjustments. The description and terms of the Rights were set forth in the Original TAPP, dated as of May 5, 2017, by and between us and Computershare Trust Company, N.A., as Rights Agent, as amended.

The TAPP was adopted in an effort to protect stockholder value by attempting to diminish the risk that our ability to use certain general business credits carryforwards to reduce potential future federal income tax obligations may become substantially limited if we experience an "ownership change," as defined by Section 382 of the Internal Revenue Code. The TAPP is intended to act as a deterrent to any person acquiring beneficial ownership of 4.99% or more of our outstanding common stock without the approval of the board of directors. Stockholders who beneficially owned 4.99% or more of our outstanding common stock upon execution of the TAPP will not trigger the TAPP so long as they do not acquire beneficial ownership of additional shares of our common stock. The board of directors may, in its sole discretion, also exempt any person from triggering the TAPP.

Limitations of Liability and Indemnification

Our bylaws provide that the Company is only authorized to provide indemnification to present or former directors or officers after a determination to do so (i) by a majority vote of the directors who are not parties to such action, suit or proceeding, even though less than a quorum, or (ii) by a committee of such directors designated by a majority vote of such directors, even though less than a quorum, or (iii) if there are no such directors, or if such directors so direct, by independent legal counsel in a written opinion, or (iv) by the stockholders.

If a determination to provide indemnification is made, then to the fullest extent permitted by applicable law, any person who was or is a party or is threatened to be made a party to any threatened, pending or completed action, suit or proceeding, whether civil, criminal, administrative or investigative (other than an action by or in the right of the corporation), by reason of the fact that such person is or was a director or officer of the corporation, or is or was a director or officer of the corporation serving at the request of the corporation as a director, officer, employee or agent of another corporation, partnership, joint venture, trust or other enterprise, against expenses (including attorneys' fees), judgments, fines and amounts paid in settlement actually and reasonably incurred by such person in connection with such action, suit or proceeding if such person acted in good faith and in a manner such person reasonably believed to be in or not opposed to the best interests of the corporation, and, with respect to any criminal action or proceeding, had no reasonable cause to believe such person's conduct was unlawful,

except that no indemnification shall be made in respect of any claim, issue or matter as to which such person shall have been adjudged to be liable to the corporation unless and only to the extent that the Court of Chancery of the State of Delaware or the court in which such action or suit was brought shall determine upon application that, despite the adjudication of liability but in view of all the circumstances of the case, such person is fairly and reasonably entitled to indemnity for such expenses which the Court of Chancery or such other court shall deem proper.

Our second amended and restated certificate of incorporation and amended and restated bylaws further provide that to the fullest extent permitted by law, a director shall not be personally liable to the Company or to our stockholders for monetary damages for any breach of fiduciary duty as a director. No amendment to, modification of or repeal of this provision shall apply to or have any effect on the liability or alleged liability of any director for or with respect to any acts or omissions of such by a director occurring prior to such amendment.

The limitation of liability and indemnification provisions in our organizational documents may discourage stockholders from bringing a lawsuit against directors for breach of their fiduciary duties. They may also reduce the likelihood of derivative litigation against directors and officers, even though an action, if successful, might benefit us and our stockholders. Moreover, a stockholder's investment may be harmed to the extent we pay the costs of settlement and damage awards against directors and officers pursuant to these indemnification provisions. Insofar as indemnification for liabilities arising under the Securities Act may be permitted to our directors, officers and controlling persons pursuant to the foregoing provisions, or otherwise, we have been advised that, in the opinion of the SEC, such indemnification is against public policy as expressed in the Securities Act, and

is, therefore, unenforceable. There is no pending litigation or proceeding naming any of our directors or officers as to which indemnification is being sought, nor are we aware of any pending or threatened litigation that may result in claims for indemnification by any director or officer.

Transfer Agent and Registrar

The transfer agent and registrar for our common stock is Computershare Trust Company, N.A.

Listing

Our common stock is listed on Nasdaq under the symbol "ARQ."

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Exhibit 10.3

ADVANCED EMISSIONS SOLUTIONS, INC.

2022 OMNIBUS INCENTIVE PLAN

RESTRICTED STOCK AWARD AGREEMENT

1. **Award of Shares.** ADVANCED EMISSIONS SOLUTIONS, INC., a Delaware corporation (the "Company"), hereby awards to the Grantee (the "Grantee") named in the Notice of Restricted Stock Award (the "Notice"), the Total Number of Shares Awarded set forth in the Notice (the "Shares"), subject to the Notice, this Restricted Stock Award Agreement (the "Agreement") and the terms and provisions of the Company's 2022 Omnibus Incentive Plan (as amended from time to time, the "Plan"), and any written employment, retention or severance agreement the Grantee has with the Company or its Affiliate addressing the award and vesting of Company common stock (the "Employment Agreement"), all of which are incorporated herein by reference. Unless otherwise defined herein, capitalized terms used herein shall have the meanings set forth in the Plan. All Shares awarded hereunder will be deemed issued to the Grantee as fully paid and non-assessable Shares and the Grantee will have the right to vote the Shares at meetings of the Company's stockholders. The Company shall pay any applicable stock transfer taxes imposed upon the issuance of the Shares to the Grantee hereunder.
2. **Consideration.** The grant of the Shares is made in consideration of the services to be rendered by the Grantee to the Company or its Affiliate.
3. **Transfer Restrictions.** The Shares awarded to the Grantee hereunder may not be sold, transferred by gift, pledged, hypothecated, or otherwise transferred or disposed of by the Grantee prior to the date when the Shares become vested pursuant to the Vesting Schedule set forth in the Notice. Any attempt to transfer Restricted Stock in violation of this Section 3 will be null and void and, if any such attempt is made, the Shares will be forfeited by the Grantee and all of the Grantee's rights to such Shares shall immediately terminate without any payment or consideration by the Company.
4. **Evidence of Stock.** The Restricted Stock may be credited to the Grantee in book entry form and held, along with any Additional Securities (as defined below and which shall also constitute "Restricted Stock" under this Agreement), in custody by the Company or an agent for the Company until the applicable restrictions have expired and the Grantee provides other instructions. If any certificates are issued for Restricted Stock during any Period of Restriction, such certificates shall bear an appropriate legend as determined by the Company referring to the applicable terms, conditions and restrictions and the Grantee shall deliver such certificate(s).
5. **Distributions.** The Company shall disburse to the Grantee all dividends and other distributions paid or made in cash with respect to the Shares and Additional Securities (whether vested or not), less any applicable withholding obligations, in one lump sum payment, within 30 days after the date the Shares (or Additional Securities) with respect to which the dividends or distributions were made become vested. If the Shares or Additional Securities are forfeited without becoming vested, any such dividends or distributions also will be forfeited and the Grantee shall have no right to such dividends or distributions.
6. **Taxes.** The Grantee shall, as Shares of Restricted Stock vest, or at the time withholding is otherwise required by any Applicable Law (including in the event Grantee coordinates with the Company to make a timely election pursuant to Section 83(b) of the Code), pay the Company the amount necessary to satisfy any applicable foreign, federal, state, and local income and employment tax withholding obligations in a form of payment acceptable to the Company. The Company will withhold that portion of Grantee's vested Shares to cover the applicable withholding tax liability unless Grantee notifies the Company that Grantee desires to elect to pay the applicable withholding tax liability by other means at least five business days prior to the applicable vesting date and in a form of payment acceptable to the Company.

7. **Additional Securities.** Any securities received as the result of ownership of the Restricted Stock (the "Additional Securities"), including, but not by way of limitation, warrants, options and securities received as a stock dividend or in a stock split, or as a result of a recapitalization or reorganization or other similar change in the Company's capital

structure, shall be retained in book entry form in the same manner and subject to the same conditions and restrictions as the Shares of Restricted Stock with respect to which they were issued, including, without limitation, the Vesting Schedule set forth in the Notice and the forfeiture provisions set forth in Section 8. The Grantee shall be entitled to direct the Company to exercise any warrant, option or other right received as Additional Securities upon supplying the funds necessary to do so, in which event the securities so purchased shall constitute Additional Securities, but the Grantee may not direct the Company to sell any such warrant, option or right. If Additional Securities consist of a convertible security, the Grantee may exercise any conversion right, and any securities so acquired shall constitute Additional Securities.

8. **Forfeiture of Shares.** If the Grantee's Continuous Service terminates prior to the vesting of any Shares for any reason, with or without Cause (including death or disability), then all of the unvested Shares of Restricted Stock shall automatically be deemed forfeited to the Company upon such termination of Continuous Service, without any action by the Company or Grantee and without any consideration due or payable to Grantee, and Grantee shall cease to have any further right, title or interest in the forfeited Restricted Stock. Upon forfeiture, the Company and/or its assigns shall become the legal and beneficial owner of the Shares forfeited and all rights and interest thereon or related thereto, and the Company shall have the right to transfer to its own name or its assigns the number of Shares forfeited, without any action by the Grantee.

9. **Stop-Transfer Notices.** In order to ensure compliance with the restrictions on transfer set forth in this Agreement, the Notice or the Plan, the Company may issue appropriate "stop transfer" instructions to its transfer agent, if any, and, if the Company transfers its own securities, it may make appropriate notations to the same effect in its own records.

10. **Refusal to Transfer.** The Company shall not be required (i) to transfer on its books any Shares that have been sold or otherwise transferred in violation of any of the provisions of this Agreement or (ii) to treat as owner of such Shares or to accord the right to vote or pay dividends to any purchaser or other transferee to whom such Shares shall have been so transferred.

11. **Restrictive Legends.** Grantee understands and agrees that the Company may cause the legend set forth below or legends substantially equivalent thereto, to be placed upon any certificate(s) evidencing ownership of the Shares, if applicable, together with any other legends that may be required by the Company or by state or federal securities laws:

THE SHARES REPRESENTED BY THIS CERTIFICATE ARE SUBJECT TO CERTAIN RESTRICTIONS ON TRANSFER, INCLUDING POSSIBLE FORFEITURE, AS SET FORTH IN THE RESTRICTED STOCK AWARD AGREEMENT BETWEEN THE ISSUER AND THE ORIGINAL HOLDER OF THESE SHARES, A COPY OF WHICH MAY BE OBTAINED AT THE PRINCIPAL OFFICE OF THE ISSUER AND SUCH TRANSFER RESTRICTIONS, INCLUDING POSSIBLE FORFEITURE, ARE BINDING ON TRANSFEREES OF THESE SHARES.

12. **Transferability.** No benefit payable under, or interest in, this Agreement or in the Shares that are scheduled to be issued hereunder shall be subject in any manner to anticipation, alienation, sale, transfer, assignment, pledge, encumbrance or charge and any such attempted action shall be void and no such benefit or interest shall be, in any manner, liable for, or subject to, your or your beneficiary's debts, contracts, liabilities or torts; provided, however, nothing in this Section 12 shall prevent transfer by will or by applicable laws of descent and distribution, as further described in Section 14 of the Plan.

13. **No Contract for Employment.** This Agreement is not an employment or service contract and nothing in this Agreement shall be deemed to create in any way whatsoever any obligation of the Grantee to continue in the employ or service of the Company, or of the Company to continue to employ Grantee.

14. **Applicability of Plan.** This Agreement is subject to all the provisions of the Plan, which provisions are hereby made a part of this Agreement, and is further subject to all interpretations, amendments, rules and regulations which may from time to time be promulgated and adopted pursuant to the Plan. In the event of any conflict between the provisions of this Agreement and those of the Plan, the provisions of the Plan shall control.

15. **No Compensation Deferral.** This Award is not intended to constitute "nonqualified deferred compensation" within the meaning of Section 409A. To the extent that the Award is nevertheless deemed to be subject to the acceleration of tax imposed under Section 409A for any reason, this Award shall be interpreted in accordance with Section 409A. Notwithstanding any provision herein to the contrary, in the event that following the Grant Date, the Committee determines that the Award may be or become subject to the acceleration of tax imposed under Section 409A, the Committee may adopt such amendments to the Plan and/or this Agreement or adopt other policies and procedures (including amendments, policies and procedures with retroactive effect), or take any other actions, that the Committee determines are necessary or appropriate to (a) preserve the intended tax treatment of the benefits provided with respect to this Award, or (b) comply with the requirements of Section 409A to avoid the acceleration of tax thereunder. Any such action may include, but is not limited to, delaying payment, to the extent required in order to avoid accelerated taxation and/or tax penalties under Section 409A, to a Grantee who is a "specified employee" within the meaning of Section 409A to the first day following the six-month period (or, if earlier, the date of the Grantee's death) after the date of the Grantee's "separation of service" as defined in Section 409A. The Company shall use commercially reasonable efforts to implement the provisions of this Section 15 in good faith; provided that neither the Company, the Committee nor any Employee, Director or representative of the Company or of any of its Affiliates shall have any liability to Grantee with respect to this Section 15.

16. **Acknowledgement.** The Company may, in its sole discretion, decide to deliver any documents related to Awards awarded under the Plan or future Awards that may be awarded under the Plan by electronic means or request your consent to participate in the Plan by electronic means. You hereby consent to receive such documents by electronic delivery and agree to participate in the Plan through an on-line or electronic system established and maintained by the Company or another third party designated by the Company.

17. **Entire Agreement:** Governing Law. The Notice, the Plan, this Agreement, and any Employment Agreement, constitute the entire agreement of the parties with respect to the subject matter hereof and supersede in their entirety all prior undertakings and agreements of the Company and the Grantee with respect to the subject matter hereof, and may not be modified adversely to the Grantee's interest except by means of a writing signed by the Company and the Grantee. In the event of any conflict between the terms set forth in the Notice or this Agreement and in the Plan, the terms of this Agreement shall control. These agreements are to be construed in accordance with and governed by the State of Delaware, excluding any conflicts or choice of law rule or principle that might otherwise refer construction or interpretation of this Plan to the substantive law of another jurisdiction. Should any provision of the Notice or this Agreement be determined by a court of law to be illegal or unenforceable, the other provisions shall nevertheless remain effective and shall remain enforceable.

18. **Headings.** The captions used in this Agreement are inserted for convenience and shall not be deemed a part of this Agreement for construction or interpretation.

19. **Dispute Resolution.** The provisions of this Section 19 shall be the exclusive means of resolving disputes arising out of or relating to the Notice, the Plan and this Agreement. The Company, the Grantee, and the Grantee's assignees (the "parties") shall attempt in good faith to resolve any disputes arising out of or relating to the Notice, the Plan and this Agreement by negotiation between individuals who have authority to settle the controversy. Negotiations shall be commenced by either party by notice of a written statement of the party's position and the name and title of the individual who will represent the party. Within 30 days of the written notification, the parties shall meet at a mutually acceptable time and place, and thereafter as often as they reasonably deem necessary, to resolve the dispute. If the dispute is not resolved by negotiation within 90 days of the written notification, the parties agree that any suit, action, or proceeding arising out of or relating to the Notice, the Plan or this Agreement shall be brought in the United States District Court for the District of Colorado (or should such court lack jurisdiction to hear such action, suit or proceeding, in a Colorado state court located in City and County of Denver, Colorado) and that the parties shall submit to the jurisdiction of such court. The parties irrevocably waive, to the fullest extent permitted by law, any objection the party may have to

the laying of venue for any such suit, action or proceeding brought in such court. **The parties also expressly waive any right they have or may have to a jury trial of any such suit, action or proceeding.** If any one or more provisions of this Section 19 shall for any reason be held invalid or unenforceable, it is the specific intent of the parties that such provisions shall be modified to the minimum extent necessary to make it or its application valid and enforceable.

20. **Compliance with Laws.** Notwithstanding anything contained in this Agreement or the Plan, the Company may not take any actions hereunder, and no award shall be granted, that would violate the Securities Act of 1933, as amended (the "Act"), the Exchange Act, the Code, or any other securities or tax or other Applicable Law or regulation. Notwithstanding anything to the contrary contained herein, the Shares issuable upon vesting shall not be issued unless such Shares are then registered under the Act, or, if such Shares are not then so registered, the Company has determined that such vesting and issuance would be exempt from the registration requirements of the Act.

21. **Notices.** Any notice required or permitted hereunder shall be given in writing and shall be deemed effectively given upon personal delivery, upon transmission via facsimile or email with confirmation of successful transmission by the sending machine or upon deposit in the United States mail by certified mail (if the parties are within the United States) or upon deposit for delivery by an internationally recognized express mail courier service (for international delivery of notice), with postage and fees prepaid, addressed to the other party at its address as set forth in the Notice, or to such other address as such party may designate in writing from time to time to the other party. If an on-line or electronic system is established for participants in the Plan as described in Section 16 of this Agreement, effective notice may also be given and governed by the notice provisions of such on-line or electronic system.

22. **Further Assurances.** The parties agree to execute such further instruments and to take such further action as may reasonably be necessary to carry out the intent of this Agreement.

23. **Counterparts.** This Agreement may be signed in two counterparts, each of which will be an original, but both of which will constitute one and the same instrument.

Signature of Grantee:

By:

Date:

ADVANCED EMISSIONS SOLUTIONS, INC.:

By:

Date:

Exhibit 10.4

**ADVANCED EMISSIONS SOLUTIONS, INC.
LONG TERM INCENTIVE PLAN
UNDER THE 2022 OMNIBUS INCENTIVE PLAN
Performance Stock Unit Agreement**

Advanced Emissions Solutions, Inc. (the “Company”), pursuant to its 2023 Long Term Incentive Plan (the “LTIP”) under its 2017 Omnibus Incentive Plan (the “Omnibus Plan”), hereby grants an award of Performance Stock Units to you, the Participant named below. The terms and conditions of this Award are set forth in this Performance Stock Unit Agreement (the “Agreement”), consisting of this cover page, the Terms and Conditions on the following pages and the attached Appendix A, and in the Omnibus Plan document and LTIP document, a copy of both document which has been provided to you. Any capitalized term that is used but not defined in this Agreement shall have the meaning assigned to it in the Omnibus Plan or LTIP, as appropriate, as they currently exist or as they may be amended in the future.

Name of Participant:
Target Number of Performance Stock Units:
Grant Date:
Performance Period:
Vesting Schedule:
Performance Goals:
* Assumes you have been in Continuous Service from the Grant Date to the vesting date.

By signing below or otherwise evidencing your acceptance of this Agreement in a manner approved by the Company, you agree to all of the terms and conditions contained in this Agreement, the LTIP and the Omnibus Plan. You acknowledge that you have received and reviewed these documents and that they set forth the entire agreement between you and the Company regarding this Award of Performance Stock Units. If you fail to sign or accept this Agreement by _____, this Award shall be void and of no further force or effect.

By /s/ Richard Campbell-Breeden
Richard Campbell-Breeden, Director
Date: March 8, 2023
PARTICIPANT:
By /s/ Carol Eicher
Carol Eicher, Director
Date: March 8, 2023
By /s/ Julian McIntyre
Julian McIntyre, Director
Date: March 8, 2023
By /s/ L. Spencer Wells
L. Spencer Wells, Director
Date: March 8, 2023

By /s/ Jeremy Blank
Jeremy Blank, Director
Date: March 8, 2023
By /s/ Gilbert Li
Gilbert Li, Director
Date: March 8, 2023
By /s/ J. Taylor Simonton
J. Taylor Simonton, Director
Date: March 8, 2023
ADVANCED EMISSIONS SOLUTIONS, INC

By:

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LOAN AGREEMENT ADVANCED EMISSIONS SOLUTIONS, INC.
LONG TERM INCENTIVE PLAN
UNDER THE 2017 OMNIBUS INCENTIVE PLAN
(USDA GUARANTEED LOAN) Performance Stock Unit Agreement
Terms and Conditions

This Loan Agreement **1. (“Agreement”) is entered into and effective Award of Performance Stock Units.** The Company hereby confirms the grant to you, as of January 27, 2021, by the Grant Date and among (i) **Community Trust Bank, Inc. (“Bank”)** subject to the terms and conditions of this Agreement, the LTIP and the Omnibus Plan, of an award of Performance Stock Units (the “Units”), in an amount initially equal to the Target Number of Performance Stock Units specified on the cover page of this Agreement. The number of Units that may actually be earned and become eligible to vest pursuant to this Award can be between 0% and 200% of the Target Number of Units, but may not (except for any Dividend Equivalent Units credited to you pursuant to Section 6 below) exceed the Maximum Number of Performance Stock Units specified on the cover page of this Agreement. Each Unit that is earned as a **Kentucky corporation;** result of the performance goals specified in Appendix A to this Agreement having been satisfied and (ii) **Corbin Project LLC, Arq Projects Holding Company LLC, Arq St. Rose LLC, Arq Corbin LLC and Arq Corbin Land LLC** (collectively, “Borrowers”), each a Delaware limited liability company.

Recitals:

A. Borrowers desire which thereafter vests represents the right to jointly and severally obtain from Bank a term loan receive one Share of the Company's common stock. Prior to their settlement or forfeiture in accordance with the principal amount terms of **Ten Million and No/100 Dollars (\$10,000,000.00) (“Loan”),** this Agreement, the proceeds of which Units granted to you will be used credited to complete a coal-refuse processing plant performance stock unit account in **Corbin, Kentucky,** your name maintained by the Company. This account will be unfunded and maintained for book-keeping purposes only, with the purchase Units simply representing an unfunded and installation unsecured contingent obligation of equipment for a demonstration of drying and blending of processed coal waste at such coal-refuse processing plant (“Project”). the Company.

B. 2. In order Restrictions Applicable to induce Bank Units. Neither this Award nor the Units subject to enter into this Award may be sold, assigned, transferred, exchanged or encumbered, voluntarily or involuntarily, other than (i) a transfer upon your death in accordance with your will, by the laws of descent and distribution or pursuant to a beneficiary designation submitted in accordance with Section 6.5 of the LTIP, or (ii) to the extent allowed by the Committee, pursuant to a domestic relations order. Following any such transfer, this Award shall continue to be subject to the same terms and conditions that were applicable to the Award

immediately prior to its transfer. Any attempted transfer in violation of this Section 2 shall be void and without effect. The Units and your right to receive Shares in settlement of any Units under this Agreement shall be subject to forfeiture except to extent the Units have been earned and thereafter vest as provided in Sections 4 and 5.

3. **No Shareholder Rights.** The Units subject to establish the Loan for Borrowers, without which inducement Bank would be unwilling this Award do not entitle you to do so, and in consideration any rights of a holder of the benefits they Company's common stock. You will receive therefrom, Borrowers desire to make the agreements set forth herein.

Agreement:

Now, therefore, for and in consideration not have any of the Recitals, and for other good and valuable consideration, the receipt and sufficiency rights of which are hereby acknowledged, the parties hereby agree as follows:

1. Definitions. As used herein, the following capitalized terms shall have the meanings set forth below. Other terms and phrases are defined elsewhere in this Agreement and the meanings shall be applicable throughout this Agreement.

1.1 ADA. "ADA" means the American with Disabilities Act, as amended.

1.2 Advance. "Advance" means a disbursement of proceeds shareholder of the Loan, as the same may be made from time to time, including the "Initial Disbursement," as defined in Section 2.2(a).

1.3 Affiliate. "Affiliate" means any Person controlling, controlled by or under common control with a Borrower and includes any Subsidiary of a Borrower.

1.4 And/or. "And/or" means one or the other or both, or any one or more or all, of the things or persons or parties Company in connection with which the conjunction is used, any Units granted or earned pursuant to this Agreement unless and until Shares are issued to you in settlement of earned and vested Units as provided in Section 5.

1.5 4. Balance Sheet Equity; Net Worth Vesting and Forfeiture of Units. Each Subject in all cases to Section 8 of "Balance Sheet Equity" this Agreement, the Units shall vest at the earliest of the following times and "Net Worth" means, with respect to Borrowers, (a) the book value degree specified.

a. **Scheduled Vesting.** The number of all assets of Borrowers, taken on a consolidated basis, Units that have been earned during the Performance Period, as determined by the Committee in accordance with GAAP, minus (b) all Appendix A, will vest on the Scheduled Vesting Date, so long as your Continuous Service has been continuous from the Grant Date to the Scheduled Vesting Date. For these purposes, the "Scheduled Vesting Date" means the date the Committee certifies (i) the degree to which the applicable performance goals for the Performance Period have been satisfied, and (ii) the number of Borrowers' Total Indebtedness, all Units that have been earned during the Performance Period as determined in accordance with GAAP, Appendix A, which certification shall occur no later than March 10 of the calendar year immediately following the calendar year during which the Performance Period ended. (b)

1.6 b. Borrowing Rate Disability. "Borrowing Rate" means, with respect If your Continuous Service terminates by reason of your Disability prior to the first sixty (60) months that Scheduled Vesting Date, then you will be entitled to have vest on the Loan is in effect ("Fixed Rate Period"), date your Continuous Service terminated a fixed rate of interest per annum equal to six percent (6.0%), thereafter automatically converting to a floating rate of interest per annum equal to the higher of: (a) six percent (6.0%); or (b) the "Prime Rate" defined herein plus two and three-quarters percent (2.75%). Following the conversion pro rata portion of the Borrowing Rate to a floating rate per annum, Target Number of Units specified on the Borrowing Rate cover page of this Agreement. The pro rata portion shall be adjusted no more frequently than quarterly. The Borrowing Rate shall be calculated on determined by multiplying your Target Number of Performance Stock Units by a fraction whose numerator is the basis of an assumed 360-day year for the actual number of days elapsed, during the Performance Period prior to your employment termination date and whose denominator is the number of days in the Performance Period.

c. **Death.** If your Continuous Service terminates by reason of your death prior to the Scheduled Vesting Date, then you will be entitled to have vest on the date your Continuous Service terminates a pro rata portion of the Target Number of Units specified on the cover page of this Agreement. The pro rata portion shall be determined in the same manner as provided in Section 4(b) above.

d. **Retirement.** If your Continuous Service terminates by reason of your Retirement (as defined in Section 9 below) prior to the Scheduled Vesting Date, then you will be entitled to have vest on the Scheduled Vesting Date a pro rata portion of the Units that would otherwise have been determined to have been

earned during the Performance Period in accordance with Bank's customary practice. Appendix A if your Continuous Service had been continuous until the Scheduled Vesting Date. The pro rata portion shall be determined in the same manner as provided in Section 4(b) above.

1.7 e. Business Day Qualifying Termination. "Business Day" means all calendar days except Saturdays, Sundays If your Continuous Service terminates prior to the Scheduled Vesting Date, and legal holidays if such termination of Continuous Service constitutes a Qualifying Termination (as defined in Section 9 below), then you will be entitled to have vest on the Scheduled Vesting Date a pro rata portion of the United States.

1.8 Capital Expenditures. "Capital Expenditures" means any expenditures of Borrowers or any Subsidiary of Borrowers Units that would be classified as capital expenditures under GAAP, including otherwise have been determined to have been earned during the "Capitalized Lease Obligations" defined herein.

1.9 Capitalized Lease Obligations. "Capitalized Lease Obligations" means the payments due under any lease of a Borrower or any Subsidiary under which the obligations of the Borrowers or such Subsidiary, as lessee, would be included in determining the total liabilities for the balance sheet of such Borrower or such Subsidiary Performance Period in accordance with GAAP. Appendix A if your Continuous Service had been continuous until the Scheduled Vesting Date. The pro rata portion shall be determined in the same manner as provided in Section 4(b).

1.10 Closing. f. "Closing" means Change in Control. If a Change in Control occurs after the Grant Date but before the Scheduled Vesting Date and your Continuous Service continues to the date upon which the disbursement of the Loan proceeds occurs. Change in Control, then the Performance Period will be truncated and will end as of the date of the Change in Control. You will be entitled to have vest as of the date of the Change in Control the number of Units that are determined to have been earned based on actual performance against the performance goals specified in Appendix A over the truncated Performance Period.

1.11 Closing Costs. g. "Closing Costs" collectively means all amounts approved in writing by Bank necessary to pay all reasonable costs, charges and expenses incurred by Bank or Borrowers in connection with making the Loan, including, but not limited to, tax and lien search charges, recording fees, escrow fees, appraisal fees, inspection and cost analysis fees, permit fees, brokers' fees, insurance premiums, and reasonable attorneys' fees and expenses.

1.12 Collateral. "Collateral" collectively means all Forfeiture of the equipment and other assets, properties and interests in which Bank has or acquires a security interest and/or lien to secure the Loan including, without limitation, as described more particularly in, the "Security Agreement" defined in Section 3.1.

1.13 Event of Default Unvested Units. "Event of Default" means To the occurrence or happening of extent any of Sections 4(a) through (f) is applicable to this Award, any Units that do not vest on the matters applicable vesting date as provided therein shall immediately be forfeited. If your employment terminates prior to the Scheduled Vesting Date under circumstances other than as set forth in Sections 4(b) through (f), all unvested Units shall immediately be forfeited.

5. Settlement of Units. Subject to Section 8 hereof.

1.14 Existing Indebtedness. "Existing Indebtedness" collectively means below, as soon as practicable after any indebtedness date on which Units vest (but no later than the 15th day of the third calendar month following the vesting date), the Company shall cause to be issued and delivered to you (or to your personal representative or your designated beneficiary or estate in the event of your death, as applicable) one Share in payment and settlement of each vested Unit. Delivery of the Shares shall be effected by the issuance of a Borrower secured stock certificate to you, by any Collateral and/or any other property, whether real, personal or otherwise, in which Bank will obtain a lien or security interest to secure the Loan.

1.15 Financial Covenants. "Financial Covenants" collectively means the financial covenants set forth in Section 5.12.

1.16 GAAP. "GAAP" means generally accepted accounting principles an appropriate entry in the United States as such accounting principles are generally accepted stock register maintained by the accounting profession from time Company's transfer agent with a notice of issuance provided to time, applied on a consistent basis.

1.17 IFRS. "IFRS" means International Financial Reporting Standards as issued you, or by the International Accounting Standards Board from time electronic delivery of the Shares to time. a brokerage account you designate, and shall be subject to the tax withholding provisions of Section 7 and compliance with all applicable legal requirements as provided in the Omnibus Plan and LTIP, and shall be in complete satisfaction and settlement of such vested Units. The Company will pay any original issue or

1.18Indebtedness. “Indebtedness” collectively means all Obligations and liabilities of Borrowers to Bank, howsoever created, arising or evidenced, whether direct or indirect, absolute or contingent, now or hereafter existing, or due or to become due, and includes the Loan and all other obligations to Bank arising in connection with this Agreement.

1.19Lease. “Lease” means that certain Lease Agreement dated August 31, 2015, from CH Development, L.L.C. to Arq Corbin Land LLC (f/k/a Hendricks Corbin Land LLC), as amended.

1.20Leased Property. “Leased Property” means the real property located in Knox County and Whitley County, Kentucky, upon which the Project is located, as described more particularly on Exhibit A attached hereto and incorporated herein by reference, which is leased to Arq Corbin Land LLC (f/k/a Hendricks Corbin Land LLC) pursuant to the Lease and subleased to Corbin Project LLC pursuant to the “Sublease” defined herein.

1.21 Loan. “Loan” means the term loan facility in the original principal amount of Ten Million and No/100 Dollars (\$10,000,000.00) established by Bank for Borrowers pursuant to Section 2 hereof.

1.22Loan Documents. “Loan Documents” collectively means this Agreement, the Notes, the Security Instruments and all other instruments and agreements related hereto and/or executed and/or delivered in connection with the Loan, as the same may be amended or modified from time to time.

1.23Net Income. “Net Income” means total income less the aggregate of total expenses (including depreciation and amortization expenses) and transfer taxes all determined in accordance with GAAP.

1.24Notes. “Notes” collectively means: (a) that certain Promissory Note of even date herewith made jointly and severally payable by Borrowers to the order of Bank in the principal amount of Eight Million and No/100 Dollars (\$8,000,000.00), as guaranteed by USDA pursuant to the “USDA Loan Note Guarantee” defined herein (“Note A”); and (b) that certain Promissory Note of even date herewith made jointly and severally payable by Borrowers to the order of Bank in the principal amount of Two Million and No/100 Dollars (\$2,000,000.00) (“Note B”).

1.25Obligations. “Obligations” collectively means and includes all loans, advances, debits, liabilities, obligations, letters of credit or acceptance transactions, trust receipt transactions, or any other financial accommodations, howsoever arising, owing by any of Borrowers to Bank, of every kind and description (whether or not evidenced by any note or other instrument and whether or not for the payment of money), direct or indirect, absolute or contingent, due or to become due, now existing or hereafter arising pursuant to the terms of this Agreement and/or the Notes, including, without limitation, all interest, fees, charges, expenses, attorneys’ fees and disbursements and accountants’ fees and disbursements chargeable to Borrowers or incurred by Bank in connection with its dealings with Borrowers and all amendments, extensions and/or renewals thereof.

1.26Person or Party. “Person” or “Party” means any natural person, sole proprietorship, corporation, partnership, limited partnership, joint venture, trust, limited liability company, unincorporated organization, association, other entity or group, institution, party or government (whether federal, state, county, city, municipal or other) or agency or division thereof.

1.27Possible Default. “Possible Default” means an event, condition, or thing which, with the lapse of any applicable grace period, the giving of notice or both, would constitute an Event of Default under Section 8 hereof.

1.28Prime Rate. “Prime Rate” means the interest rate per annum most recently quoted, or the highest of any range of interest rates quoted from time to time by The Wall Street Journal (“WSJ”) as the “Prime Rate” or base rate on corporate loans in effect at large U.S. money center commercial banks. In the event the WSJ ceases to publish a “Prime Rate,” the “Prime Rate” shall be an interest rate designated and announced from time to time by Bank as its “Prime Rate” in its principal office although that rate may not be the lowest rate available at that particular time on loans of a similar nature.

1.29Security Instruments. “Security Instruments” collectively means all of the instruments and rights currently and hereafter securing the Indebtedness, including those described Section 3.

1.30Sublease. “Sublease” means that certain Sublease dated December 7, 2015, by and among Arq Corbin Land LLC (f/k/a Hendricks Corbin Land LLC) as “Sublessor,” Corbin Project LLC as “Sublessee” and Arq Corbin LLC (f/k/a Hendricks Corbin LLC) as “Permittee,” pursuant to which Arq Corbin Land LLC subleases the Leased Property to Corbin Project LLC.

1.31Subsidiary. “Subsidiary” means (a) any corporation in which more than fifty percent (50%) of its outstanding common stock having ordinary voting power (irrespective of whether or not at the time stock of any other class or classes of such corporation shall have or might have voting power by reason of the happening of any contingency) is directly or indirectly owned by a Borrower, any Subsidiary of Borrowers and/or any combination thereof; or (b) any partnership, limited partnership, limited liability company or other entity more than fifty percent (50%) of the ownership interests (and/or instruments convertible into such interests) of which is owned directly or indirectly by a Borrower, any Subsidiary of a Borrower and/or any combination thereof.

1.32Total Indebtedness. “Total Indebtedness” means all current and long term liabilities and other obligations (including the Indebtedness and all Capitalized Lease Obligations) of Borrowers on a consolidated basis, as determined in accordance with GAAP.

1.33UCC. “UCC” means the Uniform Commercial Code as in effect in the Commonwealth of Kentucky from time to time, except to the extent that the perfection or priority and/or the effect of perfection or non-perfection of any security interest granted to Bank in connection with the Loan pursuant to any Loan Document requires the application of the Uniform Commercial Code as in effect from time to time in a jurisdiction other than the Commonwealth of Kentucky, in which event the term “UCC” shall mean the Uniform Commercial Code as in effect from time to time in such other jurisdiction.

1.34USDA. “USDA” means the United States Department of Agriculture.

1.35USDA Conditional Commitment. “USDA Conditional Commitment” means the USDA Conditional Commitment for Guarantee dated January 11, 2021, a copy of which is attached hereto as Exhibit B and incorporated herein by reference.

1.36USDA Guarantee Fee. “USDA Guarantee Fee” means Two Hundred Forty Thousand and No/100 Dollars (\$240,000.00), which is three percent (3.0%) of Eight Million and No/100 Dollars, which is eighty percent (80%) of the original principal amount of the Loan guaranteed by USDA.

1.37USDA Loan Note Guarantee. “USDA Loan Note Guarantee” means the Loan Note Guarantee under the Business and Industry Loan Guarantee Program administered by the USDA Rural Business Service, pursuant to which USDA will guarantee eighty percent (80%) of the original principal amount of the Loan.

2.Loan. Subject to the terms and conditions contained herein, Bank hereby establishes the Loan in favor of Borrowers as follows:

2.1Amount; Purpose. The principal amount of the Loan established in favor of Borrowers is Ten Million and No/100 Dollars (\$10,000,000.00). The Loan is evidenced by, and shall be payable and otherwise made on the terms set forth in, this Agreement and in the Notes. All payments on the Notes shall be made in immediately available funds at the principal office of Bank on each date as specified in the Notes. The Notes shall bear interest at the Borrowing Rate. For the first twenty-four (24) months that the Loan is in effect, Borrowers shall make interest-only payments on the Notes as set forth therein. Thereafter, Borrowers shall make monthly interest and principal payments based on a thirteen (13) year amortization on the Notes as set forth therein. Borrowers and Bank acknowledge and agree that the Notes shall be *pari passu* in right of payment and in all other respects, and all payments of principal and interest on the Notes shall be made *pro rata* based on the unpaid principal balance of each Note. The proceeds of the Loan shall be used as set forth in Recital A and as otherwise provided in this Agreement and/or established by Bank in writing. The Notes may be hereafter amended, modified, extended and/or renewed only with the prior written approval of USDA, Bank and Borrowers.

2.2 Disbursements. The disbursement of Loan proceeds shall be subject to the prior satisfaction of all conditions precedent set forth herein, in the USDA Conditional Commitment (including, without limitation, Condition 1, entitled “Purpose”) and as otherwise reasonably established by Bank, unless waived in writing by Bank. Bank shall disburse the Loan proceeds in accordance with a settlement statement approved by Bank and Borrowers at the closing of the Loan. Without limiting the foregoing:

(a)Initial Disbursement. At the closing of the Loan, Bank shall make an initial disbursement of Loan proceeds to Borrowers (“Initial Disbursement”) to enable Borrowers to pay certain Closing Costs and to reimburse Borrowers for Project-related equipment and expenses previously purchased and/or incurred by Borrowers as set forth on Schedule 2.2(a), attached hereto and incorporated herein by reference, and as further described on the settlement statement.

(b)Drawdown Period. Borrowers shall have a period of twelve (12) months from the date of this Agreement (“Drawdown Period”) within which to draw down the remaining principal amount of the Loan. Any Loan proceeds not disbursed prior to the expiration of the Drawdown Period shall not be available for disbursement thereafter.

(c)Subsequent Disbursements. All Advances made subsequent to the Initial Disbursement shall be subject to the following provisions:

(1) All requests for Advances shall be made in writing by an authorized representative of Borrowers. Advance requests shall include such documentation as Bank may reasonably request but shall contain at least either: (A) an approved invoice for Project-related equipment and/or related installation costs that Borrowers have not yet paid, in which case Bank shall disburse the Advance for payment of same directly to the vendor thereof within one (1) Business Day of Bank’s receipt of all required documentation; or (B) a receipt for Project-related equipment and/or related installation costs that have been paid for by Borrowers (provided that such equipment is physically located on-site at the Leased Property), in which

case Bank shall disburse the Advance for reimbursement of same to Borrowers within one (1) Business Day from Bank’s receipt of all required documentation.

(2) Each request by Borrowers for an Advance shall, in and of itself, constitute a continuing representation and warranty by Borrowers to Bank that: (A) Borrowers then are, and at the time the Advance is actually made will be, entitled under this Agreement to obtain that Advance; and (B) that all of the covenants, agreements, representations and warranties made by Borrowers herein are true and correct in all material respects and have been complied with in all material respects as of such date.

(3) Bank shall not be required to disburse any Loan proceeds if any of the following occur or exist: (A) an Event of Default or Possible Default exists or immediately thereafter would exist; (B) such Advance is requested to be made after the expiration of the Drawdown Period; and/or (C) Borrowers fail to submit the items required to be submitted hereunder relative to an Advance.

2.3Prepayment Penalty. During the first five (5) years that the Loan is in effect (“Prepayment Penalty Period”), Borrowers shall pay a prepayment penalty for any prepayment of the Notes, in whole or in part, made using the proceeds of (a) any financing, refinancing or loan established for the benefit of any of Borrowers by a bank, lender or financial institution other than Bank or (b) any initial public offering of any of Borrowers, which penalty shall be based on the aggregate outstanding principal balance of the Notes at the time such prepayment is made, calculated in accordance with the following schedule:

Penalty Amount (percentage of aggregate outstanding principal balance)	
Year	
1	5%
2	4%
3	3%
4	2%
5	1%

Upon the expiration of the Prepayment Penalty Period, prepayments may be made on the Notes without premium or penalty. Any partial prepayment of the Notes shall be applied first to accrued but unpaid interest on the Notes, and then to payment of the Advances which, according to Bank’s records, have most recently been disbursed, unless interest on the Notes is delinquent, in which event such prepayment shall first be applied, at Bank’s sole option, to such delinquent interest and then as above provided. Borrowers shall not be entitled to re-borrow any amounts prepaid or repaid on the Notes. For the avoidance of doubt, any prepayment of the Notes, in whole or in part, made using funds other than the proceeds of (a) any

financing, refinancing or loan established for the benefit of any of Borrowers by a bank, lender or financial institution other than Bank or (b) any initial public offering of any Borrowers shall not be subject to any prepayment penalty.

2.4Maturity Date. The Maturity Date of the Notes, at which time all outstanding principal and accrued but unpaid interest on the Notes shall be due and payable in full, shall be January 27, 2036.

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2.5Origination Fee. In addition to accruing interest on the Loan, and all other fees and expenses payable by Borrowers to Bank under the Loan Documents, Borrowers have agreed to pay to Bank an origination fee in the amount of One Hundred Thousand and No/100 Dollars (\$100,000.00) ("Origination Fee"). The Origination Fee shall be due and payable upon the closing of the Loan. This fee is non-refundable and shall not be applied to any other Indebtedness of Borrowers to Bank.

3.Security for the Indebtedness. The Indebtedness, including the Notes, is and shall be secured by, and entitled to the benefits of, all the following:

3.1Security Agreement. A first and prior security interest in and to the Collateral described in that certain Security Agreement of even date herewith by and among one or more of Borrowers and Bank ("Security Agreement"), including, without limitation, the machinery and equipment specifically identified on Exhibit C attached hereto and incorporated herein by reference, with a current "Fair Market Value in Continued Use" of Thirty-Four Million and No/100 Dollars (\$34,000,000.00), which value is based solely on the appraisal ordered by Bank as contemplated in Section 4.10 of this Agreement.

3.2USDA Loan Note Guarantee. The guarantee by USDA of eighty percent (80%) of the original principal amount of the Loan, as set forth in the USDA Loan Note Guarantee.

3.3Right of Offset. The right of offset specified in Section 9.3 hereof.

3.4Other Security. Other security and instruments, if any, granted to Bank by any of Borrowers and/or others, whether of even date herewith or hereafter or heretofore granted, to secure the Notes and/or any other Indebtedness.

4.Conditions Precedent. Bank's obligations under this Agreement, including the disbursement of any proceeds under the Loan, shall be subject to the fulfillment to Bank's satisfaction of each of the following conditions precedent, and such other conditions contained elsewhere herein and as Bank may impose in its discretion (collectively, "Conditions Precedent"), unless such condition or conditions shall be waived by Bank in writing, in the sole discretion of Bank.

4.1Resolutions and Approvals. Borrowers shall furnish certified copies of all consents, waivers, resolutions and approvals as may be required by Bank in the exercise of its sole discretion, including those evidencing approval of the execution and delivery of the Loan Documents by Borrowers, all in form and substance acceptable to Bank.

4.2Loan Documents. All of the Loan Documents, and such other documents or instruments as Bank may reasonably require, all in form and substance acceptable to Bank, shall have been duly executed and delivered to Bank, and, where appropriate, duly recorded or filed in the proper public offices.

4.3Representations, Warranties and Covenants. All representations and warranties of Borrowers contained herein and in all of the other Loan Documents shall be true and correct in all material respects, and Borrowers shall be in compliance in all material respects with all covenants contained in this Agreement and in all of the other Loan Documents.

4.4Insurance. Satisfactory proof that policies of insurance of the types and coverages as specified in this Agreement and as otherwise required by Bank are in full force and effect.

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4.5Consents of Third Parties. Such third-party consents, estoppels and/or agreements as Bank may require, including without limitation any consents, waivers, estoppels and/or subordination, non-disturbance and attornment agreements, related to any of the Collateral and/or Security Instruments, all of which shall be in form and substance satisfactory to Bank in its sole discretion.

4.6Lien Searches. Bank shall have been provided with UCC, tax lien and judgment lien searches performed in such locations as Bank shall determine in the exercise of its sole discretion, which shall indicate that all of Borrowers' assets and any other Person's assets acting as security for the Loan are free and clear of all liens and encumbrances, other than the Permitted Encumbrances or any other encumbrances expressly permitted by Bank in writing.

4.7Entity Matters. Bank shall have been provided with true, correct and complete copies of each Borrower's formation and governing documents, including all amendments, and shall have been provided such further information as shall have been requested by Bank regarding the business, properties, finances and operations of Borrowers, without any such items revealing any materially adverse matter.

4.8Release of Collateral for Existing Indebtedness. Bank shall have reached an agreement with the holder(s) of the Existing Indebtedness, in form and substance acceptable to Bank, pursuant to which such holder(s) shall release of record all mortgages, security instruments, financing statements and other documents securing the Existing Indebtedness to the extent that such mortgages, security interests, financing statements or other documents encumber any of the Collateral or any other property or assets securing the Loan.

4.9Taxpayer ID Numbers. Borrowers shall have provided Bank with their taxpayer identification numbers.

4.10Appraisal. Bank shall have received an appraisal of the Collateral in form and substance acceptable to Bank, establishing the loan-to-value ratio for equipment and machinery, which shall not exceed seventy percent (70%). The equipment and machinery appraisal must be prepared in accordance with the Uniform Standards of Professional Appraisal Practice.

4.11Legal Opinions. Bank shall have received written opinions, addressed to Bank and dated as of the Closing (a) from Bank's counsel, rendering such enforceability opinions regarding the Loan Documents as Bank and/or USDA may reasonably require; and (b) from Borrowers' counsel, rendering such enforceability opinions and opinions regarding Borrowers' organization and good standing, current tax reporting status (which shall be based solely on such factual certifications of Borrowers as Borrowers' counsel may reasonably require), pending litigation and other pertinent matters as Bank and/or USDA may reasonably require, which shall be expressly designated for reliance upon by Bank's counsel in rendering its enforceability opinion to Bank.

4.12USDA Conditional Commitment for Guarantee. Borrowers shall have satisfied any and all conditions required by USDA to obtain USDA's unconditional guarantee of eighty percent (80%) of the original principal amount of the Loan, as set forth in the USDA Conditional Commitment.

4.13Fees and Costs. The USDA Guarantee Fee shall have been paid in full to USDA, which amount shall be deemed to have been fully earned upon Borrowers' execution of this Agreement, and Borrowers shall have paid all Closing Costs and the Origination Fee.

4.14Taxes and Assessments. All taxes and assessments due on the Collateral shall have been paid in full.

4.15Interest Reserve Escrow. Borrowers shall have deposited the sum of One Million Two Hundred Thousand and No/100 Dollars (\$1,200,000.00) into an escrow deposit account maintained with Bank to be known as the "Interest Reserve Account," which shall be subject to the terms and conditions of an escrow agreement by and among Borrowers and Bank and shall be in form and substance acceptable to Bank.

4.16Borrowers' Equity. Bank shall have received evidence satisfactory to Bank in its discretion that Borrowers have used at least Five Million and No/100 Dollars (\$5,000,000.00) of Borrower's own cash funds toward the Project (which may include working capital expenditures).

5. Affirmative Covenants. Borrowers jointly and severally agree that until the principal of and all interest on the Notes and all the other Indebtedness have been paid in full and this Agreement terminated, Borrowers shall perform and observe, or cause to be performed and observed, all of the following:

5.1Insurance. Subject to the additional requirements in this Section 5.1, at all times during which the Loan is in effect, Borrowers shall insure themselves, the Collateral and all of their other assets and properties acting as collateral for the Loan, to such extent and against such hazards and liabilities as is commonly done by businesses similarly situated, but in no event shall the insurance maintained by Borrowers be less in amount or type of coverage than specifically required hereby, by any of the Security Instruments and/or as otherwise required by Bank, including the following:

(a) workers compensation insurance as required by applicable law;

(b) commercial general liability insurance naming Bank as an additional insured, in such amounts as reasonably required by Bank and consistent with insurance held by businesses within Borrowers' industry; and

(c) special form cause of loss property insurance on a 100% replacement cost coverage basis, naming Bank as additional insured, mortgagee, loss payee and/or lender's loss payee, as reasonably requested by Bank. Borrowers shall, within five (5) Business Days after written request by Bank, furnish to Bank full information concerning such insurance and promptly effect such additional insurance to protect against additional risks and in additional amounts as Bank may reasonably request from time to time, with Bank named as additional insured, mortgagee, loss payee and/or lender's loss payee as requested by Bank, which policies shall be in forms approved by Bank. All insurance shall provide that the issuer of such insurance shall be required to provide Bank with at least thirty (30) days' written notice prior to any cancellation or non-renewal of such insurance or reduction in the amount of coverage.

5.2Money Obligations. Borrowers shall pay in full:

(a) Prior in each case to the date when penalties would attach, all taxes, assessments and governmental charges and levies hereafter due (except only those so long as and to the extent that the same shall be contested in good faith by appropriate and timely legal proceedings and for which a bond staying execution or enforcement thereof shall have been posted to Bank's satisfaction); and

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(b) All of Borrowers' debts, obligations and liabilities incurred after the date hereof, on or prior to their respective due dates (or within any applicable cure periods applicable thereto), for which Borrowers may be or become liable or to which any or all of Borrowers' assets may be or become subject.

5.3Financial Statements and Tax Returns; Other Financial Information.

(a) Borrowers shall furnish to Bank on an annual basis, commencing within ninety (90) days after year ending December 31, 2021, audited consolidating and consolidated financial statements prepared in accordance with GAAP and certified by a firm of independent certified public accountants of recognized standing acceptable to Bank. Each Borrower shall also furnish to Bank a copy of its federal income tax returns, including all schedules and accompanying statements, within thirty (30) days after filing (provided that such returns shall be filed on or prior to the applicable filing deadlines, including any extensions properly and timely filed with the Internal Revenue Service).

(b) Borrowers shall furnish to Bank, immediately upon Bank's written request, such other financial reports and information about their financial condition, properties and operations as Bank may from time to time reasonably request.

(c) All financial statements specified in Section 5.3(a) above shall be furnished to Bank with comparative figures for the corresponding period in the preceding fiscal year, shall be prepared in accordance with GAAP on an accrual basis of accounting and certified by a firm of independent certified public accountants of recognized standing reasonably acceptable to Bank. Bank acknowledges and agrees that the accounting firm of Ernst & Young is acceptable to Bank. If the maturity date of the Notes is extended, the requirements to supply financial statements

to Bank shall continue on a schedule consistent with the schedule set out above. All financial statements specified in Section 5.3(a) shall be accompanied by a certificate of a duly authorized member, manager or officer (as applicable) of Borrowers:

- (1) stating that there exists no Event of Default or Possible Event of Default hereunder; or
- (2) describing with particularity any existing Event of Default or Possible Default, stating the nature thereof, the period of existence thereof and what action Borrowers have taken or propose to take with respect thereto.

(d) Borrowers shall furnish to Bank prompt written notice of any condition or event which has resulted in or might reasonably be expected to result in any of the following:

- (1) a material adverse change in the condition (financial or otherwise) of any of Borrowers;
- (2) a material breach by a Borrower of, or Borrower's material noncompliance with, any term, condition or covenant contained herein or in any other Loan Document; and/or
- (3) a material breach by a Borrower of, and/or a Borrower's material noncompliance with, (A) any term, condition and/or covenant of any material contract to which any Borrower is a party or by which any Borrower or its property may be bound that would result in a material adverse change to the financial condition of Borrowers, and/or (B) the Lease or Sublease.

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(e) Borrowers shall furnish to Bank, no later than five Business Days after any Borrower becomes aware of same, prompt written notice of any claims, proceedings or disputes (whether or not purportedly on a Borrower's behalf) against, or to such Borrower's knowledge, threatened in writing or affecting any of Borrowers which, if adversely determined, would have a material adverse effect on the business, properties or condition (financial or otherwise) of such Borrower (without in any way limiting the foregoing, claims, proceedings, or disputes involving monetary amounts in excess of \$250,000.00 not fully covered by insurance shall be deemed to be material), any labor controversy resulting in or threatening to result in a strike against any Borrower and/or any proposal by any public authority to acquire any material assets or business of a Borrower.

(f) At the Closing, Borrowers shall deliver to Bank a post-closing balance sheet prepared in accordance with GAAP that will reflect Borrowers' post-Closing status and confirm that Borrowers have a Balance Sheet Equity position of no less than twenty percent (20.0%) of the assets of Borrowers at the time the USDA Loan Note Guarantee is issued.

5.4 Financial Records. Each of Borrowers shall:

- (a) At all times keep materially true and complete financial records in accordance with GAAP consistently applied;
- (b) Subject to reasonable confidentiality restrictions, at all reasonable times upon prior notice of at least three (3) Business Days, permit Bank to examine any or all of such Borrower's financial information and other books and records and to make excerpts therefrom and transcripts thereof, and/or submit copies of such information and records to Bank;
- (c) Upon Bank's request, submit to Bank copies of such Borrower's budgets, financial projections, minutes and other entity documents, material correspondence with third parties regarding the Project and/or such Borrower's business operations and all other documents that Bank may reasonably request;
- (d) Maintain such Borrower's books and records at the address set forth for Notices in Section 10 and make the same available to Bank upon request in accordance with this Agreement; and
- (e) Maintain such Borrower's current fiscal year.

5.5 Collateral Maintenance. Borrowers shall maintain and preserve the tangible Collateral in good condition and repair, subject only to normal wear and tear, and Bank shall have the right to inspect the same from time to time upon reasonable prior written notice and subject to compliance with any safety requirements of Borrowers.

5.6Existence and Licenses. Each Borrower shall preserve its limited liability company existence in good standing and will be and remain qualified to do business in good standing in all states in which it is required to be so qualified and will maintain all permits, licenses and other similar matters necessary or appropriate for its business.

5.7Notice. Borrowers (acting by and through their respective duly authorized representatives) shall notify Bank in writing within no more than two (2) Business Days after any of Borrowers (or any of their respective members, managers, officers or other duly authorized representatives) learns of any of the following:

(a) the existence or occurrence of any Event of Default or Possible Default under this Agreement, the Notes or any other Loan Document;

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(b) any representation or warranty made herein or in any other Loan Document or related writing not being, or ceasing to be, for any reason, in any material respect, true and complete and not misleading; and/or

(c) the institution of, or adverse determination of, any litigation, arbitration or governmental proceeding (including, without limitation, an audit or examination by the Internal Revenue Service) which would have a material and adverse effect upon any of Borrowers, which notification shall describe the nature thereof, what happened with respect thereto and what steps are being taken by Borrowers with respect thereto.

5.8Agreements. Borrowers shall timely comply in all material respects with all of their respective agreements and valid obligations to and with all Parties and shall not commit any material default thereunder. Without limiting the generality of the foregoing, Borrowers shall observe and comply in all material respects with all agreements affecting the Collateral and with all of the terms and provisions of the Security Instruments.

5.9Subordination. Borrowers hereby agree that all current and future debts of a Borrower to any member, manager or officer of a Borrower, any Affiliate of a Borrower (and/or any of such Affiliate's shareholders, directors, officers, members or managers, as the case may be) shall be and, to the extent a Borrower is the obligee, are hereby declared to be fully subordinated to the prior repayment of all the Indebtedness and no payments of principal or interest on such other debts shall be made without the prior written consent of Bank until the Indebtedness has been paid in full. Within ten (10) days of any request by Bank, Borrowers shall provide Bank with written confirmation of such subordination, in form and substance acceptable to Bank.

5.10Payment of Notes and Other Indebtedness. Borrowers shall timely pay the Notes and all of the other Indebtedness in accordance with their respective terms. All payments on the Notes and the other Indebtedness shall be made to Bank in immediately available funds at Bank's principal office on the date due by no later than 2:00 p.m. Bank's local time. Funds received by Bank after that time shall be deemed to be received by Bank on the following Business Day.

5.11Compliance with Laws and Agreements; ADA and Employment Laws. Borrowers shall at all times comply in all material respects with the applicable statutes, regulations, ordinances and other laws applicable to Borrowers' operations and activities. Borrowers shall timely apply for and diligently pursue obtaining proper governmental permits, licenses, approvals, clearances and authorizations necessary for the commencement and continuation of the Project. Without limiting the generality of the foregoing, Borrowers shall comply in all material respects with all federal, state and local equal opportunity and non-discrimination laws and shall certify to Bank that Borrowers are in compliance with the ADA with respect to the Project or, alternatively, issue and transfer of Shares to you pursuant to this Agreement, and all fees and expenses incurred by it in connection therewith. If the Units that vest include a fractional Unit, the ADA is not applicable to Borrowers with respect Company shall round the number of vested Units to the Project. All nearest whole Unit prior to issuance of Borrowers' facilities at Shares as provided herein.

6. **Dividend Equivalents.** If the Project that Company pays cash dividends on its Shares while any Units subject to this Agreement are accessible outstanding, then on the date this Award vests pursuant to Section 4 above, a Total Dividend Equivalent amount will be credited to your performance stock unit account and shall be deemed reinvested in additional Units ("Dividend Equivalent Units"). The Total Dividend Equivalent amount will be determined by multiplying the number of underlying Units determined to have vested by the per share amount of each cash dividend paid on the Company's common stock with a record date and payment date occurring between the Grant Date and the applicable vesting date, and adding those products together. Each of those products is referred to as a "Dividend Equivalent Amount." The number of Dividend Equivalent Units to be credited to your performance stock unit account pursuant to this deemed reinvestment will be determined by dividing each Dividend Equivalent Amount by the Fair Market Value of a share of the Company's common stock on the applicable dividend payment

date and adding those quotients together. Any Dividend Equivalent Units so credited will be fully vested and subject to settlement with the underlying Units as provided in Section 5 above.

7. **Tax Consequences and Withholding.** No Shares will be delivered to you in settlement of vested Units unless you have made arrangements acceptable to the public shall be in material compliance with the ADA.

5.12 Compliance with Financial Covenants. Until the Indebtedness is paid in full, Borrowers shall comply in all material respects with the following Financial Covenants, each of which will be tested on an annual basis based on Bank's review of Borrowers' financial statements provided to Bank in accordance with Section 5.3(a):

(a) **Ratio of Indebtedness to Net Worth.** Borrowers shall not permit the ratio of their Total Indebtedness to their Net Worth to be more than four (4) to one (1).

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(b) **Minimum Balance Sheet Equity.** After Closing, Borrowers shall not permit their Balance Sheet Equity to be less than twenty percent (20.0%) of the book value of all assets of Borrowers, taken on a consolidated basis.

(c) **Debt Service Coverage Ratio.** Commencing with the fiscal year ending December 31, 2023, and at all times thereafter, the ratio of Borrowers' (i) net income plus interest, taxes, depreciation and amortization, divided by (ii) Borrowers' interest expense, plus current maturities of long-term debt, shall meet or exceed a ratio of 1.25 to 1. This ratio shall be tested on annual basis based on the previous twelve-month period.

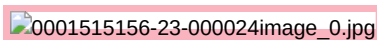
5.13 Credit Reporting. Borrowers shall comply with all credit requests from Dun & Bradstreet or other reputable reporting agencies.

5.14 Compliance with USDA. Upon written notice from Bank, Borrowers shall immediately take any and all actions reasonably necessary to satisfy, comply with and assist Bank in its compliance with the USDA Conditional Commitment attached hereto as Exhibit B, including the specific requirements Company for the issuance of the USDA Loan Note Guarantee, and including the USDA environmental requirements contained in Condition 17 of the USDA Conditional Commitment that Borrowers shall comply with the following measures, identified in USDA's environmental review process, to avoid or reduce adverse environmental impacts from the Project's equipment installation and/or operation as follows:

(a) The Project shall comply with all requirements set forth in the Governor's Office for Local Development letter dated November 2, 2020, from Ms. Lee Nalley; and

(b) Borrowers shall maintain, or cause to be maintained, all required permits and approvals for the Project, including the following:

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5.15 Inspections. Bank and/or the USDA and their representatives and designees may, upon request and prior reasonable notice of at least three (3) Business Days and in compliance with all applicable laws, enter upon the Leased Property and any buildings located thereon to inspect the Collateral and the status of the Project, subject to Borrowers' safety requirements. Such representatives and designees will be entitled to inspect Borrowers' books and records maintained at the Leased Property and make copies thereof.

5.16 Indemnification. Without limiting any other indemnification obligation of Borrowers set forth herein and/or in any other Loan Document, Borrowers hereby jointly and severally indemnify Bank from and hold Bank harmless against any and all losses, liabilities, costs and

expenses suffered or incurred by Bank arising from any claims made by third parties related to any personal injury, death or damage to property occurring due to the operation of the Project and/or the ownership, use and/or operation payment of any of the Collateral, except to the extent federal, state, local or foreign withholding taxes that such claims are caused by the gross negligence or willful misconduct of Bank and/or its employees, agents or contractors. Borrowers shall undertake, at their sole cost and expense and through counsel reasonably satisfactory to Bank, the defense of Bank in any lawsuit or other proceeding commenced may be due as a result of any such injury, death or property damage. The provisions of this Section 5.16 shall survive the execution and delivery of this Agreement and the payment in full of Shares. You hereby authorize the Indebtedness.

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5.17 Compliance with Lease, Sublease and Permits. Borrowers shall observe, comply in all material respects with and maintain in full force and effect Company (or cause the observance by any Borrower or its Affiliates of and compliance with and the maintenance in full force and effect of) the Lease, Sublease and all other agreements, contracts, permits and documents materially affecting or pertaining Affiliate to the Project and/or the Collateral. For the avoidance of doubt, any term or provision of the Lease or Sublease the nonobservance of or noncompliance with would be reasonably likely to result in the termination of the Lease or Sublease (subject to any applicable notice or cure period) shall be deemed material for purposes of this Section 5.17). As long as any of the Indebtedness remains outstanding, Arq Corbin Land LLC and Corbin Project LLC shall timely exercise all rights to extend or renew the terms of, respectively, the Lease and Sublease, and Arq Corbin LLC shall maintain all permits necessary or appropriate for the operation of the Project in full force and effect and good standing.

5.18 Project Information. Borrowers will, upon Bank's written request, furnish to Bank all reasonably pertinent information and data with respect to the construction, development, operation and any other aspect or component of the Project.

5.19 Control over Collateral. To the extent that any Person who is not a party to this Agreement has or obtains any interest in any of the Collateral (which Borrowers shall not cause or permit to happen without Bank's prior written consent), Borrowers will cause all such Persons to comply with the covenants and agreements contained herein pertaining to the Collateral.

6. Negative Covenants. Borrowers jointly and severally agree that, until the principal of and all interest on the Notes and all of the other Indebtedness have been paid in full and this Agreement terminated, Borrowers shall observe and comply with, or cause to be observed and complied with, each of the following provisions:

6.1 Liens. Borrowers shall not incur, create, assume or suffer to exist any pledge, lien, charge, security interest withhold from payroll or other encumbrance of amounts payable to you any nature whatsoever on any of the Collateral, except for the following (collectively, "Permitted Encumbrances"):

(a) the liens sums required to satisfy such withholding tax obligations, and security interests granted by Borrowers otherwise agree to Bank in connection with the execution of this Agreement and those, if any, subsequently consented to by Bank in writing;

(b) liens or security interests in any of the Collateral (excluding the "Equipment" defined in the Security Agreement, with respect to which Borrowers shall not grant any third Person a lien or security interest without the prior written consent of Bank, which may be granted or withheld in Bank's sole discretion) arising from indebtedness permitted pursuant to Section 6.10, provided that any satisfy such liens and security interests shall be junior and subordinate to the liens and security interests of Bank in such Collateral; and

(c) any statutory landlord's lien in and to any of the Collateral pursuant to KRS 383.070, which shall be junior and subordinate to the liens and security interests of Bank in such Collateral pursuant to that certain Estoppel Certificate and Lien Subordination of even date herewith executed in favor of Bank by Arq Corbin Land LLC, Corbin Project LLC and the landlord under the Lease; and

(d) the lien of ad valorem property taxes not yet due and payable.

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6.2 Advances, Repayment of Debts and Distributions. Without Bank's prior written consent, and contingent on the Loan being current and in good standing, Borrowers shall not make any advances or make any payment of principal or interest on any debt owed to any member, manager, shareholder, director or officer of any of Borrowers, any Affiliate of any of Borrowers (or any of such Affiliate's shareholders, directors, officers, members or managers, as the case may be), provided that any such permitted advance shall be subordinate to the payment in full of the Loan.

6.3 Mergers, Sales and Transfers. Without Bank's prior written consent, each of Borrowers shall not (whether in one transaction or in a series of transactions):

- (a) Be or become a party to any consolidation, reorganization or merger;
- (b) Sell all or substantially all of its assets;
- (c) Purchase all or a substantial part of the assets of any other Person or other business enterprise;
- (d) Lease, sell, transfer or otherwise dispose of (or enter into any agreement to do any of the foregoing) any interest in any Collateral or in any other asset exceeding \$250,000.00 in value (which shall not be interpreted to prohibit the sale of coal and coal by-products); or
- (e) Effect any change in its capital structure or amend its organizational or governing documents.

6.4 Subsidiaries. Without Bank's prior written consent, Borrowers shall not create any Subsidiaries; acquire any capital stock or other equity or interests in another corporation, limited liability company, entity, partnership, limited partnership, other entity, joint venture or business; transfer any ownership interest in any Subsidiary or grant any option or other rights with respect thereto; or permit any existing Subsidiary to issue any additional equity rights or grant any options or other rights with respect thereto. Borrowers shall not transfer, assign or lend any money or other property to any Subsidiary.

6.5 Change in Business or Management. Borrowers shall not change materially the nature of Borrowers' business in any manner. Borrowers shall not make any changes in Borrowers' senior management without prior written notice to Bank.

6.6 Indebtedness. Borrowers shall not co-sign or endorse any liabilities, obligations or indebtedness of any other Person while the Loan is outstanding or provide any security for any of the foregoing if such actions would constitute or effect a lien on any of the Collateral in favor of any Person other than Bank. Subject to Section 6.10 below, Borrowers will not, without the prior written consent of Bank, co-sign or endorse any liability or obligation that, in Bank's opinion, will substantially weaken Borrowers' consolidated financial condition. The foregoing shall not be interpreted to prohibit a Borrower from co-signing or endorsing any liability or obligation for another Borrower as long as Borrowers continue to comply with the Financial Covenants. Without the prior written consent of Bank, Borrowers shall not incur any indebtedness for borrowed money whatsoever or guarantee or become directly or contingently liable on any notes or other evidence of indebtedness or contract of any kind, or enter any contract or agreement requiring Borrowers to make payments regardless of the performance by the other party or that has the effect of constituting a guarantee (and Borrowers shall not make any guarantee for any Affiliate), except only for royalties payable under the Lease, trade payables incurred by Borrowers in the ordinary course of business and equipment financed through other lenders which is not in the aggregate in excess of \$5,000,000.00.

6.7 Loans. Borrowers shall not make any loans to any Affiliate (other than another Borrower) or to any of their (or of any Affiliate's) respective officers, directors, shareholders, members or managers until the Indebtedness has been repaid in full. The foregoing shall not be interpreted to prevent Arq Corbin Land LLC from making the "Landlord Payments" defined in the Sublease directly to the landlord under the Lease if Corbin Project LLC fails to do so, in accordance with the provisions of Section 4.17 of the Sublease. Additionally, Borrowers Omnibus Incentive Plan. You may elect to satisfy such withholding tax obligations by having the Company withhold a number of Shares that would otherwise be issued to you

in settlement of the Units and that have a fair market value equal to the amount of such withholding tax obligations by notifying the Company of such election prior to the Vesting Date.

8. **Forfeiture of Award and Compensation Recovery**

a. **Forfeiture Conditions.** Notwithstanding anything to the contrary in this Agreement, if your Continuous Service is terminated for Cause, or if, during the term of your Continuous Service with the Company and its Subsidiaries and for one year after such Continuous Service ends (the "Restricted Period"), you breach any of the restrictive covenants contained in your employment agreement, if any, then (i) you shall immediately forfeit this Award and any right to receive Shares that have not **make** yet been issued pursuant to Section 5, and (ii) with respect to Shares that have been issued pursuant to this Award, either (A) you shall return such Shares to the Company, or (B) you shall pay to the Company in cash an amount equal to the Fair Market Value of such Shares as of the respective vesting date of the underlying Units.

b. **Compensation Recovery Policy.** In addition to the provisions in Sections 8(a), to the extent that this Award and any **loans** compensation associated therewith is considered "incentive-based compensation" within the meaning and subject to the requirements of Section 10D of the Exchange Act, this Award and any compensation associated therewith shall be subject to potential forfeiture or **advance** recovery by the Company in accordance with any **funds whatsoever**, compensation recovery policy adopted by the Board or the Committee in response to the requirements of Section 10D of the Exchange Act and any implementing rules and regulations thereunder adopted by the Securities and Exchange Commission or any national securities exchange on which the Company's Shares are then listed. This Agreement may be unilaterally amended by the Committee to comply with any such compensation recovery policy.

c. **Remedies.** The parties expressly agree that the forfeiture and repayment obligations contained in this Section 8 do not constitute the Company's exclusive remedy for your violation of Section 8. The Company may seek any additional legal or equitable remedy, including injunctive relief, for any such violation.

9. **Definitions**

a. **Good Reason.** "Good Reason" means, notwithstanding the definition in the Omnibus Plan, the occurrence of any of the following events or conditions unless consented to by you (and you shall be deemed to have consented to any such event or condition unless you provides written notice of your non-acquiescence within 90 days of the effective time of such event or condition and the Company cannot or does not cure any such event or condition within 30 days upon such notice): (i) a material and substantial diminution in your responsibilities or duties as in effect immediately preceding the event or condition; (ii) a material reduction in your base salary; or (iii) a geographical relocation of your primary work location to at any place outside a 50-mile radius from your previous primary work location. Notwithstanding the foregoing, any change in (ii) that applies in substantially the same manner to similarly situated Participants will not be deemed to be Good Reason.

b. **Qualifying Termination.** "Qualifying Termination" means you cease to be an Employee (or other Company service provider) due either to an involuntary termination for reasons other than **in the ordinary course of business without the prior written consent of Bank and USDA**. Cause or a resignation for Good Reason.

6.8 Prepayment of Other Debts. c. **Borrowers shall not prepay prior to their respective presently existing maturities any debts or liabilities, except the Notes and other Indebtedness.**

6.9 Cause Distributions and Compensation. The total amount of distributions, dividends or compensation to Borrowers' members, managers and/or officers (including salaries, bonuses, commissions, fees, withdrawals or other payments, whether direct or indirect, and dividends paid on the "York Capital Preferred Stock," "Cause" means "Cause" as that term is defined in the **USDA Conditional Commitment**) will Omnibus Plan.

d. **Disability.** "Disability" means that you are unable to engage in any substantial gainful activity by reason of any medically determinable physical or mental impairment that can be expected to result in death or can be expected to last for a continuous period of not less than 12 months.

e. **Retirement.** "Retirement" means a termination of your Continuous Service, other than for Cause, occurring at or after age 65.

10. **Notices.** Every notice or other communication relating to this Agreement shall be in writing and shall be mailed to or delivered (including electronically) to the party for whom it is intended at such address as may from time to time be designated by it in a notice mailed or delivered to the other party as herein provided. Unless and until some other address is so designated, all notices or communications by you to the Company shall be mailed or delivered to the Company, to the attention of its General Counsel, at its office at 8501 E Maplewood Drive, Ste.210, Greenwood Village, CO 80111, and all notices or communications by the

Company to you may be given to you personally or may be mailed or, if you are still a Company service provider, emailed to you at the address indicated in the Company's records as your most recent mailing or email address.

11. **Administration.** You understand that the Company and its Subsidiaries hold certain personal information about you, including, but not limited to, an amount information such as your name, home address, telephone number, date of birth, salary, nationality, job title, social security number, social insurance number or other such tax identity number and details of all Awards or other entitlement to shares of common stock awarded, cancelled, exercised, vested, unvested or outstanding in your favor ("Personal Data").

You understand that in order for the Company to process your Award and maintain a record of Shares under the Omnibus Plan, the Company shall collect, use, transfer and disclose Personal Data within the Company and among its Affiliates electronically or otherwise, as necessary for the implementation and administration of the Omnibus Plan including, in the case of a social insurance

number, for income reporting purposes as required by law. You further understand that the Company may transfer Personal Data, electronically or otherwise, to third parties, including but not limited to such third parties as outside tax, accounting, technical and legal consultants when taken together, such third parties are assisting the Company or its Affiliates in the implementation and administration of the Plan. You understand that such recipients may be located within the jurisdiction of your residence, or within the United States or elsewhere and are subject to the legal requirements in those jurisdictions. You understand that the employees of the Company, its Affiliates and third parties performing work related to the implementation and administration of the Plan shall have access to the Personal Data as is necessary to fulfill their duties related to the implementation and administration of the Omnibus Plan. By accepting this Award, you consent, to the fullest extent permitted by law, to the collection, use, transfer and disclosure, electronically or otherwise, of your Personal Data by or to such entities for such purposes and you accept that this may involve the transfer of Personal Data to a country which may not have the same level of data protection law as the country in which this Agreement is executed. You confirm that if you have provided or, in the future, will not adversely affect provide Personal Data concerning third parties including beneficiaries, you have the repayment ability consent of such Borrower. Such amount shall not be increased year over year unless (a) an after-tax profit was made third party to provide their Personal Data to the Company for the same purposes.

You understand that you may, at any time, request to review the Personal Data and require any necessary amendments to it by contacting the Company in writing. As well, you may always elect to forego participation in the preceding fiscal year, (b) Borrowers Omnibus Plan, the LTIP or any other award program.

12. **Additional Provisions.**

a. **No Right to Continued Service.** This Agreement does not give you a right to continued employment or service with the Company or any Affiliate, and the Company or any such Affiliate may terminate you at any time and otherwise deal with you without regard to the effect it may have upon you under this Agreement.

b. **Governing Plan Document.** This Agreement and the Award are subject to all the provisions of the Omnibus Plan, the LTIP, and will remain in compliance with to all interpretations, rules and regulations which may, from time to time, be adopted and promulgated by the Committee pursuant to the Plan. If there is any conflict between the provisions of this Agreement and the USDA Conditional Commitment, (c) all Omnibus Plan or LTIP, the provisions of such Borrower's debts are paid to a current status, (d) Borrowers have been current with the Loan payments for twelve (12) consecutive months, Omnibus Plan or LTIP, as applicable, will govern.

c. **Governing Law and (e) such Borrower has obtained Bank's prior written approval. For Venue.** This Agreement, the avoidance of doubt, any distribution parties' performance hereunder, and the relationship between them shall be governed by, a Borrower to its members construed, and enforced in accordance with the provisions of its operating agreement for purposes of paying such members' federal and state income tax obligations shall be permitted.

6.10 Capital Expenditures; Disposition of Fixed Assets. Borrowers will not invest in additional debt-financed fixed asset purchases in an annual aggregate amount of more than \$5,000,000.00 without Bank's prior written consent, which consent shall not be unreasonably withheld, conditioned or delayed. Borrowers shall not lease, sell, transfer or otherwise encumber the Collateral without the prior written consent of Bank. Any sale or other disposition of any fixed assets constituting any of the Collateral shall also require the prior written consent of USDA Rural Development.

6.11 Outside Investing Activities. Outside business investing by Borrowers and loans or advances from Borrowers to their Affiliates and/or to their (and/or their Affiliates') respective members, managers and/or officers that are not otherwise addressed in this Agreement require Bank's prior written consent. Any loans to any of Borrowers from another Borrower, an Affiliate and/or any of their respective members, managers and/or officers

must be subordinated in writing to the Loan as set forth in this Agreement or converted to an equity interest (subject to Bank's prior written consent regarding the terms of such equity interest), and no payments shall be made on any of such debts unless the Loan is current and in good standing.

6.12Lease; Sublease. Without Bank's prior written consent, Corbin Land LLC and Corbin Project LLC shall not assign, terminate, forfeit or amend the Lease or Sublease in any material manner or further sublease all or any portion of the Leased Property, provided, however, that Bank's consent to an amendment of the Lease or Sublease shall not be unreasonably withheld, conditioned or delayed.

7.Representations and Warranties. Borrowers hereby jointly and severally represent and warrant to Bank as follows, which warranties and representations shall be deemed to be continuing and shall survive the execution of this Agreement:

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7.1Existence and Licenses. Each Borrower is a validly existing limited liability company in good standing under the laws of the state **State** of its organization and is qualified **Delaware**, without giving effect to do business with all required certifications and approvals in all states in which it owns the choice of law principles thereof. The parties agree that any properties **action relating to** or carries on substantial activities or is otherwise required to be so qualified, and has, and shall at all times maintain, in full force and effect, all licenses and permits necessary or appropriate for its business.

7.2Authority and Enforceability. No registration with or approval of any governmental agency or court of any kind is required for the due execution and delivery of, or for the enforceability **arising out** of this Agreement or any of the other Loan Documents. Borrowers have the legal power and right to execute and deliver this Agreement and the other Loan Documents to which they are parties and to observe and perform all of the provisions thereof. Borrowers' respective execution and delivery of this Agreement and the other Loan Documents and the performance and observance by Borrowers of the provisions of hereof and thereof do not and will not violate any existing provision in Borrowers' organizational or governing documents or any law applicable to Borrowers or otherwise constitute a default or violation under any existing contract or other obligation binding upon any of Borrowers or their property, with or without the passage of time or the giving of notice or both. Each Person executing and delivering each Loan Document to which a Borrower is a party has been duly authorized to do so, and this Agreement and the other Loan Documents are legally binding upon Borrowers.

7.3Litigation and Taxes. No litigation or proceeding involving Borrowers is pending or, to the knowledge of Borrowers, threatened in any federal, state or local court or administrative agency. Borrowers are not in default **shall take place exclusively** in the payment **State** of any tax, nor is any assessment threatened in respect thereof (other than the assessment of ad valorem property taxes not yet due **Colorado**, and payable), and Borrowers have timely filed all federal, state and local tax returns (or timely filed for extensions) and have paid all taxes required to be paid therewith. The charges, accruals and reserves in respect of taxes on the financial statements of Borrowers are adequate as determined in accordance with GAAP in all material respects. Borrowers know of no proposed material tax assessment against any of Borrowers, and no extension of time for the assessment of federal, state or local taxes of any of Borrowers is in effect or has been requested except as disclosed in the financial statements furnished to Bank.

7.4Financial Statements. Borrowers' compiled, unaudited financial statements furnished to Bank prior to the execution of this Agreement are true and complete, have been prepared in accordance with IFRS and adjusted compliant with GAAP, subject to normal year-end audit adjustments and the absence of footnotes, omit no material contingent liabilities of any kind that are not disclosed or otherwise reflected therein and fairly present Borrowers' respective financial conditions as of their dates and the results of Borrowers' operations for the respective fiscal periods then ending. Since the respective dates of such statements, there has been no material adverse change in any of Borrowers' respective financial condition, properties or businesses. Borrowers do not have any contingent liabilities which, if determined adversely to Borrowers (either singly or in the aggregate), would have a material adverse effect on Borrowers.

7.5Default. No Possible Default or Event of Default exists under this Agreement, nor will any such default begin to exist immediately after the execution and delivery hereof.

7.6Liens. The assets of Borrowers are subject only to the Permitted Encumbrances.

7.7ERISA. Borrowers are not liable under any defined benefit plan or multi-employer pension plan.

7.8 Investment Company Act. No Borrower is an “investment company” or a company “controlled” by an “investment company” within the meaning of the Investment Company Act of 1940, as amended.

7.9 Regulation U. No Borrower is engaged principally or as one of its important activities in the business of extending credit for the purpose of purchasing or carrying margin stock within the meaning of Regulation U of the Board of Governors of the Federal Reserve System. No part of the proceeds of the Loan will be used, directly or indirectly, for the purpose of purchasing or carrying any margin stock within the meaning of Regulation U of the Board of Governors of the Federal Reserve System or for the purpose of purchasing or carrying or trading in any securities under such circumstances so as to involve any of Borrowers in a violation of Regulation X of said Board or to involve Bank in a violation of Regulation U of said Board.

7.10 Environmental Matters. Borrowers hereby jointly and severally represent and warrant to Bank that: (a) there are no hazardous substances disposed of, stored or present on, in or under, any of the Leased Property in violation of any Environmental Laws, nor have Borrowers arranged for the storage, treatment, transportation reuse, recycling or disposal of any such substances or wastes at any other sites prior to the date hereof, any of which disposal, storage, presence or arrangement would reasonably be expected to result in a material adverse claim against any of Borrowers; (b) there are no releases in reportable quantities under CERCLA of any hazardous substances to the environment from or at any facility owned or operated by any of Borrowers which would reasonably be expected to result in any material obligation or liability of any of Borrowers; (c) Borrowers are in compliance in all material respects with all federal, state and local statutes, rules, ordinances and other laws and regulations relating to protection of the environment, including, without limitation, the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act and the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. §6901, et seq.; the Clean Air Act, 42 U.S.C. §7401, et seq.; the Clean Water Act, 33 U.S.C. §1251, et seq.; the Safe Drinking Water Act, 42 U.S.C. §300f, et seq.; the Toxic Substances Control Act, 15 U.S.C. §2601, et seq.; the Federal Insecticide, Fungicide and Rodenticide Act, 7 U.S.C. §136, et seq.; the Emergency Planning and Community Right-To-Know Act, 42 U.S.C. §11001, et seq.; and the Comprehensive Environmental Response, Compensation and Liability Act, as amended, 42 U.S.C. §9601, et seq. (“CERCLA”) (collectively, “Environmental Laws”); (d) no conditions exist at any facility of any of Borrowers which would necessitate remedial action by any of Borrowers under CERCLA or any other Environmental Law; (e) no conditions exist on any other property for which any Borrower is, or would reasonably be expected to be, responsible for all or any portion of costs or expenses in any material amount associated with the clean-up of such property under CERCLA or any other Environmental Laws; (f) no liens have been asserted against any assets of any of Borrowers for all or any portion of the costs or expenses associated with the clean-up of any waste disposal site or other property under CERCLA or any other Environmental Laws; and (g) there are no pending or threatened material claims, assessments, or litigation against any of Borrowers with respect to any alleged material noncompliance with any Environmental Laws. Borrowers jointly and severally agree to indemnify and hold harmless Bank from any and all losses, costs, liabilities, damages, costs and expenses (including reasonable attorneys’ fees) which may result from any of the aforesaid representations or warranties being untrue at any time and for any liability of any nature which may be incurred by Bank under CERCLA or any other Environmental Laws relating to any transaction between Bank and Borrowers. This indemnity shall survive the payment in full of the Notes, and the discharge and/or release of the other Loan Documents.

7.11 Zoning. The Leased Property is properly zoned for the operation of the Project, and Borrowers have no knowledge of any fact or circumstance that would render any portion of the Leased Property unavailable or unsuitable for the operation of the Project. Borrowers are in compliance with all applicable zoning, land use and subdivision laws, regulations, restrictions and ordinances relative to the use of the Leased Property for the Project.

7.12 Contracts and Leases. All contracts and leases of Borrowers necessary or appropriate for the Project (including, without limitation, the Lease and Sublease) have been or will be duly authorized, executed and entered into by Borrowers and are in full force and effect. There are no defaults by Borrowers or any other Person currently existing under any such contract or lease and Borrowers and all other Persons who are parties to such contracts and leases have fully performed and complied with all of their obligations and responsibilities thereunder as of the date hereof.

8.Events of Default. The occurrence of any or all of the following events constitute an Event of Default under this Agreement:

8.1 Payments. If any installment of principal or interest on any of the Indebtedness, including but not limited to any Note, shall not be paid in full punctually when due and payable, subject to any applicable grace period.

8.2 Defaults Under Loan Documents. If any breach of or "Event of Default" occurs under any other Loan Document (as such term is defined in such other Loan Document) and continues beyond any applicable notice and cure periods.

8.3 Covenants and Agreements. If Borrowers shall violate or fail to perform or observe, or fail to cause to be performed or observed, any covenant, agreement, condition or other provision (other than as governed by Section 8.1 or 8.2 hereof) contained or referred to in this Agreement and such failure or omission shall not have been fully corrected to Bank's complete satisfaction within fifteen (15) days (or such other grace or cure period as may be expressly provided for) after Bank has given written notice thereof to Borrowers, provided, however, that if such failure or omission is not reasonably susceptible of cure within fifteen (15) days but Borrowers have initiated a cure and are diligently pursuing same within such period, Borrowers shall have an additional period of fifteen (15) days within which to cure such failure or omission.

8.4 Failure to Pay Other Indebtedness. If any of Borrowers shall fail to pay or perform any other material obligation such Borrowers may have or become subject to with respect to any Person within any applicable grace or cure period that shall materially adversely affect any of Borrowers' financial condition.

8.5 Accuracy of Statements. If any representation or warranty or other statement of fact contained herein or in any of the Loan Documents or in any writing, certificate, report or statement at any time furnished by or for any of Borrowers to Bank pursuant to or in connection with this Agreement or otherwise in connection with the transactions contemplated hereby shall be false or misleading in any material respect or shall omit to state a material fact required to be stated therein in order to make the statements contained therein, in light of the circumstances under which made, not misleading, on the date as of which made, whether or not made with knowledge of same.

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8.6 Judgments and Liens. If a final judgment or judgments for the payment of money in excess of the sum of \$250,000.00 in the aggregate (excluding any amounts covered by insurance) shall be rendered against any of Borrowers and such judgment or judgments shall remain unsatisfied and in effect and shall not have been discharged within forty-five (45) consecutive days after the entry thereof and execution thereon shall not have been stayed pending appeal, or if so stayed, ten (10) days after the expiration of such stay, or if a lien or notice of lien is filed against any of Borrowers' assets (other than Permitted Encumbrances), including mechanics' or materialmen's liens and state or federal tax liens, or if an action to enforce a lien upon or security interest in any of Borrowers' assets, is commenced.

8.7 Solvency and Other Matters. If any of Borrowers shall:

- (a) discontinue business;
- (b) make a general assignment for the benefit of creditors;
- (c) apply for or you consent to the appointment jurisdiction of a custodian, receiver, trustee the federal and/or liquidator state courts in Colorado. You further consent to personal jurisdiction and venue in both such courts and to service of all process by United States Mail or a substantial part of its or their assets; express courier service in any such action.
- (d) be adjudicated a bankrupt or insolvent;
- (e) file a voluntary petition in bankruptcy or file a petition or an answer seeking a composition, reorganization or an arrangement with creditors or to take advantage of any other law (whether federal or state) relating to relief for debtors, or admit (by answer, default or otherwise) the

material allegations of any petition filed against it in any bankruptcy, reorganization, composition, insolvency or other proceeding (whether federal or state) relating to relief for debtors;

(f) suffer or permit to continue unstayed and in effect for thirty (30) consecutive days any judgment, decree or order entered by a court or governmental agency of competent jurisdiction, which assumes control of any of Borrowers or approves a petition seeking a reorganization, composition or arrangement of any of Borrowers or any other judicial modification of the rights of any of Borrowers' creditors, or appoints a custodian, receiver, trustee or liquidator for any of Borrowers or for all or a substantial part of any of Borrowers' business or assets;

(g) not be paying its debts as they become due; or

(h) be enjoined or restrained from conducting all or a material part of any of its or their business as now conducted and the same is not dismissed and dissolved within thirty (30) days after the entry thereof.

9.Remedies Upon Default. Notwithstanding any contrary provision or inference herein or elsewhere, Bank shall have the following rights and remedies upon an Event of Default:

9.1Optional Acceleration. If any Event of Default referred to in Sections 8.1 through 8.6 hereof shall occur, Bank, in its absolute discretion, without further notice to Borrowers, may declare all or any of the Indebtedness, including but not limited to the Notes, to be, whereupon the same shall be, accelerated and immediately due and payable in full, all without any presentment, demand, protest or notice of any kind, all of which are hereby expressly waived by Borrowers.

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9.2Automatic Acceleration. If any Event of Default referred to in Section 8.7 hereof shall occur, all of the Indebtedness, including the Notes, shall thereupon become accelerated and immediately due and payable in full, all without presentment, demand, protest or notice of any kind, all of which are hereby expressly waived by Borrowers.

9.3Offsets. If any Event of Default or Possible Default shall occur or begin to exist, Bank shall have the right then, or at any time thereafter, to set off against, and to appropriate and apply toward the payment of the Indebtedness (in such order as Bank may select in its sole discretion), including but not limited to the indebtedness evidenced by the Notes, whether or not such Indebtedness shall then have matured or be due and payable and whether or not Bank has declared the Notes and/or other Indebtedness to be in default and immediately due, any and all deposit balances and other sums and indebtedness and other property then held or owed by Bank to or for the credit or account of any of Borrowers, and in and on all of which Borrowers hereby grant Bank a first-priority security interest and lien to secure all of the Indebtedness, all without notice to or demand upon Borrowers or any other Person, all such notices and demands being hereby expressly waived.

9.4Termination of Disbursements. Upon the occurrence of any Possible Default, Bank may immediately cease making Advances under the Loan (to the extent the same remain available for disbursement) while any Possible Default exists. Upon the occurrence of any Event of Default, Bank shall thereafter have no obligation under any circumstances to make any further Advances under the Loan and may pursue all other remedies available to Bank hereunder.

9.5Rights Under Security Instruments. If any Event of Default shall occur, Bank shall also have all rights and remedies granted to Bank under any and all of the Security Instruments and the other Loan Documents.

9.6Rights Cumulative. All of Bank's rights and remedies upon the occurrence of an Event of Default or Possible Default hereunder shall be cumulative to the greatest extent permitted by law and shall be in addition to all those rights and remedies afforded to Bank at law and/or in equity.

10.Notices.

10.1Giving of Notices. All notices, requests, consents, approvals, waivers, demands and other communications hereunder (collectively, "Notices") shall be made in writing and (a) delivered to a reputable express messenger service (such as Federal Express or United Parcel Service) for overnight delivery on the next Business Day, or (b) delivered via first class United States mail, postage prepaid, return receipt request, in each case addressed as follows (or to such other address as a party shall have given Notice to the others):

If to Bank: Community Trust Bank, Inc.
346 North Mayo Trail
Pikeville, KY 41501
Attn: Stephen Belcher

If to Borrowers: Corbin Project LLC
301 East Main Street, Suite 1100
Lexington, KY 40507
Attn: R. William West

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Arq Projects Holding Company LLC
301 East Main Street, Suite 1100
Lexington, KY 40507
Attn: R. William West

Arq St. Rose LLC
301 East Main Street, Suite 1100
Lexington, KY 40507
Attn: R. William West

Arq Corbin LLC
301 East Main Street, Suite 1100
Lexington, KY 40507
Attn: R. William West

Arq Corbin Land LLC
301 East Main Street, Suite 1100
Lexington, KY 40507
Attn: R. William West

10.2 Time Notices Deemed Given. Notices shall be deemed given one (1) Business Day following the proper delivery of the Notice to a reputable overnight delivery service for delivery on the next Business Day, or two (2) Business Days following the deposit of the Notice into the United States mail as set forth above, as the case may be.

11.Fees and Expenses. Borrowers shall pay all out-of-pocket expenses (including attorneys' fees and costs) reasonably incurred by Bank in connection with the transactions contemplated hereunder, including, but not limited to, Bank's reasonable fees and expenses incurred in preparing and revising this Agreement and the other Loan Documents, in the closing of the Loan and the perfection (or continuation of perfection) of any lien or security interest granted to Bank to secure the Loan, including all filing and recording fees and taxes. Further, following an Event of Default hereunder or an "Event of Default" under any other Loan Document (as such term is defined in such other Loan Document), Borrowers will pay to Bank, to the extent allowable by applicable law, such further amounts as shall be sufficient to fully reimburse Bank for all of its costs and expenses of enforcing its rights and remedies under this Agreement, and the other Loan Documents and in protecting or preserving any security for the Indebtedness including, without limitation, Bank's reasonable attorneys', appraisers' and accountants' fees, court costs, security costs and maintenance costs, and the same shall be deemed evidenced by the Notes and secured by all of the Security Instruments. All obligations provided for in this Section shall survive termination or cancellation of this Agreement for any reason whatsoever.

12.Miscellaneous Provisions. This Agreement shall be subject to the following miscellaneous provisions:

12.1Construction. The parties have participated jointly in the negotiation and drafting of this Agreement. In the event an ambiguity or question of intent or interpretation arises, this Agreement shall be construed as if drafted jointly by the parties and no presumption of burden of proof shall arise favoring or disfavor any party by virtue of the authorship of any of the provisions of this Agreement. Unless the context clearly states otherwise, the use of the singular or plural in this Agreement shall include the other and the use of any gender shall include all others. All references to "Section" or "Sections" refer to the corresponding Section or Sections of this Agreement. Unless otherwise expressly provided, the word "including" does not limit the preceding words or terms.

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12.2Counterparts; Electronic Signatures. This Agreement may be executed in multiple counterparts, each of which shall be deemed an original, but all of which, when taken together, shall constitute one and the same Agreement. Executed copies hereof may be delivered by facsimile, by email of a PDF document or by other electronic means and, upon receipt, shall be deemed originals and binding upon the parties hereto, provided, however, that the foregoing shall not be deemed to prohibit Bank from requiring the delivery of original signatures. Signature pages may be detached and reattached to physically form one document. Each party agrees that if Bank permits the use of electronic signatures in this Agreement and electronic signatures are used in this Agreement, they are intended to authenticate this Agreement and to have the same force and effect as manual, "wet ink" signatures.

12.3Entire Agreement. This Agreement, including the Recitals hereto and all exhibits and schedules, all of which are incorporated herein by reference, and all of the other Loan Documents, collectively embody the entire agreement and understanding of the parties hereto with respect to the subject matter herein contained, and supersede all prior agreements, correspondence, arrangements and understandings relating to the subject matter hereof.

12.4Further Assurances. Borrowers agree to (a) furnish upon Bank's request such further information, (b) execute and deliver such other documents and (c) do such other acts and things, all as Bank may reasonably request for the purpose of carrying out the intent of this Agreement and the documents referred to in this Agreement.

12.5Headings. The headings in this Agreement are included for purposes of convenience only and shall not be considered a part of this Agreement in construing or interpreting any provision hereof.

12.6Invalidity of Provisions; Severability. If any provision of this Agreement or the application thereof to any Person or circumstance shall to any extent be held in any proceeding to be invalid, illegal or unenforceable, the remainder of this Agreement, or the application of such provision to Persons or circumstances other than those to which it was held to be invalid, illegal or unenforceable, shall not be affected thereby, and shall be valid, legal and enforceable to the fullest extent permitted by law. Notwithstanding the foregoing, each party hereto agrees that it has reviewed the provisions of this Agreement, and that the same, taken as a whole, are fair and reasonable.

12.7Binding Effect; No Assignment. The provisions of this Agreement shall bind be severable and benefit the parties hereto and their respective heirs, personal representatives, successors and permitted assigns, including each subsequent holder, if any provision of the Notes or any other Indebtedness. Borrowers shall not assign or transfer this Agreement is found by any other Loan Document court to be unenforceable, in whole or in part, the remainder of this Agreement shall nevertheless be enforceable and binding on the parties. You also agree that any trier of their rights fact may modify any invalid, overbroad or obligations hereunder or thereunder without the prior written consentunenforceable provision of Bank, which may be granted or withheld in Bank's reasonable discretion, this Agreement so that such provision, as modified, is valid and enforceable under applicable law.

12.8 e. **Modifications Binding Effect.** This Agreement may will be modified only binding in writing executed by all respects on your heirs, representatives, successors and assigns, and on the parties hereto, successors and assigns of the Company.

12.9 f. **Time Section 409A of Essence the Code.** Time is The award of the essence to the performance of the obligations set forth Units as provided in this Agreement and in all any issuance of the other Loan Documents. Shares or payment pursuant to this Agreement are intended to be exempt from

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Section 409A of the Code under the short-term deferral exception specified in Treas. Reg. § 1.409A-1(b)(4).

12.10 g. **Waiver Electronic Delivery and Acceptance.** Bank's rights The Company may deliver any documents related to this Performance Stock Unit Award by electronic means and remedies hereunder are cumulative request your acceptance of this Agreement by electronic means. You hereby consent to receive all applicable documentation by electronic delivery and not alternative. Neither to participate in the failure nor Omnibus Plan and LTIP through an on-line (and/or voice activated) system established and maintained by the Company or the Company's third-party stock plan administrator.

13. **Appendix.** This Award and the Shares acquired under the Plan upon settlement of the Units shall be subject to any delay by Bank and all special terms and provisions, if any, as set forth in exercising any right, power, or privilege under the Appendix for your country of residence, which Appendix is incorporated into and made a part of this Agreement.

By signing the cover page of this Agreement or the documents referred to in otherwise accepting this Agreement will operate as in a waiver of such right, power or privilege, and no single or partial exercise of any such right, power or privilege will preclude any other or further exercise of such right, power or privilege or the exercise of any other right, power or privilege. Each such right, power, remedy or privilege may be exercised by Bank, either independently or concurrently with others, and as often and in such order as Bank may deem expedient. To the maximum extent permitted by applicable law, no waiver that may be given by a party hereto will be applicable except in the specific instance for which it is given. No waiver or consent granted by Bank with respect to this Agreement, any other Loan Document or the Indebtedness shall be binding upon Bank, unless specifically granted in writing by a duly authorized officer of Bank, which writing shall be strictly construed.

12.11 Indemnification and Release. Borrowers hereby release Bank from any liability for any error of judgment or for any act done or omitted by Bank so long as Bank shall have acted in good faith and without gross negligence or willful misconduct. Under no circumstances shall Bank be deemed a fiduciary for any of the parties to this Agreement. Borrowers hereby jointly and severally indemnify, release and hold harmless Bank from and against any and all claims, damages, losses, liabilities and related costs and expenses (including reasonable attorneys' fees) incurred by Bank or asserted against Bank by any Person (including any of Borrowers) arising out of, in connection with or by reason of (a) the execution or delivery of any Loan Document or any agreement or instrument contemplated by any Loan Document, the performance manner approved by the parties thereto of their respective obligations under any Loan Document or the consummation of the transactions contemplated by the Loan Documents, (b) the Loan or the actual or proposed use of the proceeds therefrom, (c) any actual or prospective claim, investigation, litigation or proceeding relating to any of the foregoing, whether based on contract, tort or any other theory, whether brought by a third Person or by any of Borrowers, except to the extent such claims, damages, losses, liabilities or related costs and expenses are determined by a court of competent jurisdiction by final and nonappealable judgment to have resulted from the gross negligence or willful misconduct of Bank. The provisions of this Section shall survive the making of the Loan indefinitely.

12.12 Interpretation. The parties hereto hereby Company, you agree that this Agreement shall be so interpreted to give effect and validity to all the provisions hereof to the fullest extent permitted by law.

12.13 Errors terms and Omissions. For conditions described above and in consideration of Bank's agreement the Omnibus Plan document and LTIP document.

Exhibit 10.30

ADVANCED EMISSIONS SOLUTIONS, INC.

INDUCEMENT AWARD

GRANT NOTICE FOR
NONQUALIFIED STOCK OPTIONS

FOR GOOD AND VALUABLE CONSIDERATION, Advanced Emissions Solutions, Inc. (the "Company"), hereby grants to close Participant named below the Loan, Borrowers agree that, if requested by Bank, they shall fully cooperate in the correction of Nonqualified Stock Option (the "Option") to purchase any clerical or scrivener's errors in any part or all of the Loan Documents if deemed necessary or desirable number of shares of common stock, par value \$0.001 per share, of the Company (the "Common Stock") that are covered by this Option at the Exercise Price per share, each

specified below, and upon the terms and subject to the conditions set forth in this Grant Notice and the Standard Terms and Conditions (the “Standard Terms and Conditions”) attached hereto as Exhibit A. This Option is granted outside of the Advanced Emissions Solutions, Inc. 2022 Omnibus Incentive Plan (the “Plan”), but shall be subject to terms and conditions substantially identical to the terms and conditions set forth in the reasonable exercise Plan as if the Option were a Nonqualified Stock Option granted under the Plan. This Option is an inducement material to Participant’s entry into employment with the Company within the meaning of Bank’s discretion in order Nasdaq Listing Rule 5635(c)(4). This Option is not intended to ensure the validity qualify as an incentive stock option under Section 422 of the Loan Documents and the liens and security interests granted to Bank in connection with the Loan. Such requests may include, but are Code. Capitalized terms not limited to, all changes, corrections, re-executions or modifications of any of the Loan Documents and/or the execution of any additional documents as may be required by Bank. If Borrowers fail to meet their respective obligations under this Section, Borrowers agree that they shall be jointly and severally liable for, and shall pay or reimburse Bank for, all losses incurred or sustained by Bank caused by such failure, including actual costs, expenses, reasonable legal fees and court costs.

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12.14 Survival of Covenants, Agreements, Warranties and Representations. All covenants, agreements, warranties and representations made by Borrowers otherwise defined herein shall survive have the making of the Loan and delivery of the Notes, this Agreement and the other Loan Documents and shall be deemed to be continuing covenants, agreements, representations and warranties at all times while any portion of the Indebtedness, including the Notes, remains unpaid (and, if applicable, shall be further deemed to be remade and restated by them at the time of each Advance made under the Loan).

13. Governing Law. This Agreement and all other Loan Documents are executed and delivered in, and shall be governed by the laws of, the Commonwealth of Kentucky, without giving effect to any conflict of laws rule or principle that might require the application of the laws of another jurisdiction, except to the extent otherwise meaning set forth herein or therein, except as otherwise required by the UCC and except that matters respecting title and/or the creation, perfection, priority and/or foreclosure of liens on, and security interests in, any real property shall be governed by the internal laws of the state where such real property is located if such state is other than the Commonwealth of Kentucky.

14. Jurisdiction; Venue. Borrowers hereby irrevocably agree that any legal action or proceeding against any of them arising out of this Agreement may be brought in the federal and/or state courts located in Fayette County, Kentucky, and hereby irrevocably consent and submit to the jurisdiction of said courts. Nothing herein shall in any way be deemed to limit the ability of Bank to serve any writs, process or summons in any other manner permitted by applicable law or to obtain jurisdiction over any of Borrowers in such other jurisdictions, and in such manner, as may be permitted by applicable law. Borrowers irrevocably waive any objection that any of them may now or hereafter have to the laying of the venue of any suit, action or proceeding arising out of or in relation to this Agreement brought in the federal and/or state courts located in Fayette County, Kentucky, and also irrevocably waive any claim that any such suit, action or proceeding brought in any one of those courts has been brought in an inconvenient forum.

15. Jury Trial Waiver. BORROWERS HEREBY KNOWINGLY, VOLUNTARILY AND INTENTIONALLY WAIVE THE RIGHT ANY OF THEM MAY HAVE TO A TRIAL BY JURY IN RESPECT OF ANY LITIGATION AND/OR ANY OTHER PROCEEDING BASED ON, ARISING OUT OF, UNDER AND/OR IN CONNECTION WITH THIS AGREEMENT, ANY OTHER LOAN DOCUMENT AND/OR OUT OF ANY COURSE OF CONDUCT, COURSE OF DEALING, STATEMENTS (WHETHER WRITTEN OR ORAL) AND/OR ACTIONS OF BORROWERS AND/OR BANK.

[Remainder of Page Intentionally Left Blank; Signatures Follow]

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In Witness Whereof, the parties have entered into this Agreement as of the date first written above. Plan.

COMMUNITY TRUST BANK, Name of Participant:	Robert E. Rasmus									
Grant Date:	July 17, 2023									
Number of Shares of Common Stock covered by Option:	1,000,000.00									
Exercise Price per Share:	\$3.00									
Expiration Date:	July 17, 2033									
Vesting Commencement Date:	July 17, 2023									
Vesting Schedule:	<p>Subject to the Plan and the Standard Terms and Conditions, the Option shall vest in accordance with the following schedule, so long as Participant remains continuously employed by the Company or its Subsidiaries from the Grant Date through such vesting date:</p> <table><tr><th>Vesting Date</th><th>Cumulative Shares That Are Exercisable</th></tr><tr><td>First Anniversary of the Vesting Commencement Date</td><td>333,333</td></tr><tr><td>Second Anniversary of the Vesting Commencement Date</td><td>666,666</td></tr><tr><td>Third Anniversary of the Vesting Commencement Date</td><td>1,000,000</td></tr></table> <p>Notwithstanding the foregoing, the Option shall become fully vested and exercisable upon (i) the Company's termination of Participant's employment without Cause (as defined in that certain Employment Agreement between the Company and Participant dated July 17, 2023 (the "Employment Agreement")), (ii) Participant's resignation for Good Reason (as defined in the Employment Agreement), or (iii) a Change in Control.</p>		Vesting Date	Cumulative Shares That Are Exercisable	First Anniversary of the Vesting Commencement Date	333,333	Second Anniversary of the Vesting Commencement Date	666,666	Third Anniversary of the Vesting Commencement Date	1,000,000
Vesting Date	Cumulative Shares That Are Exercisable									
First Anniversary of the Vesting Commencement Date	333,333									
Second Anniversary of the Vesting Commencement Date	666,666									
Third Anniversary of the Vesting Commencement Date	1,000,000									

By accepting this Grant Notice, Participant acknowledges that he or she has received and read, and agrees that this Option shall be subject to, the terms of this Grant Notice, the Plan, and the Standard Terms and Conditions.

ADVANCED EMISSIONS SOLUTIONS, INC.

By: /s/ Stephen Belcher

Name: Stephen Belcher, Senior Vice President

Title: ("Bank")

L. Spencer
Wells

L. Spencer
Wells

Chairman of
the Board of
Directors

CORBIN PROJECT LLC

By: /s/ R. William West

R. William West, President

PARTICIPANT

/s/ Robert E. Rasmus

ARQ PROJECTS HOLDING COMPANY LLC

By: /s/ R. William West

R. William West, President

ARQ ST. ROSE LLC

By: /s/ R. William West

R. William West, President

ARQ CORBIN LLC

By: /s/ R. William West

R. William West, President

ARQ CORBIN LAND LLC

By: /s/ R. William West

R. William West, President

(collectively, "Borrowers")

Robert E.
Rasmus

EXHIBIT A

ADVANCED EMISSIONS SOLUTIONS, INC.

INDUCEMENT AWARD

**STANDARD TERMS AND CONDITIONS FOR
NONQUALIFIED STOCK OPTIONS**

These Standard Terms and Conditions apply to the Options granted pursuant to the Grant Notice to which these Standard Terms and Conditions are attached (the "Grant Notice"). Although the Option is granted outside of the Plan, the Option shall be subject to the terms of the Plan as if granted thereunder, which are incorporated into these Standard Terms and Conditions by this reference. Capitalized terms not otherwise defined herein shall have the meaning set forth in the Plan or the Grant Notice, as applicable.

1. TERMS OF OPTION

The Company has granted to the Participant the Option to purchase up to the number of shares of Common Stock at an Exercise Price per share, each as set forth in the Grant Notice. The Option is subject to the conditions set forth in the Grant Notice, these Standard Terms and Conditions, and the Plan. For purposes of these Standard Terms and Conditions and the Grant Notice, any reference to the Company shall include a reference to any Subsidiary.

2. NONQUALIFIED STOCK OPTION

The Option is not intended to be an incentive stock option under Section 422 of the Code and will be interpreted accordingly.

3. EXERCISE OF OPTION

(a) The Option shall not be exercisable as of the Grant Date set forth in the Grant Notice. After the Grant Date, to the extent not previously exercised, and subject to termination or acceleration as provided in these Standard Terms and Conditions and the Plan, the Option shall be exercisable only to the extent it becomes vested, as described in the Grant Notice or the terms of the Plan, to purchase up to that number of shares of Common Stock as set forth in the Grant Notice; provided, that the Participant remains employed with the Company and does not experience a termination of employment.

(b) To exercise the Option (or any part thereof), the Participant shall deliver a written notice to the Company, setting forth the number of shares of Common Stock with respect to which the Option is to be exercised and specifying the method of payment of the Exercise Price.

(c) The Exercise Price of the Option is set forth in the Grant Notice. The Company shall not be obligated to issue any shares of Common Stock until the Participant shall have paid the total Exercise Price for that number of shares of Common Stock. The Exercise Price shall be payable to the Company: (i) in cash or its equivalent, (ii) by tendering (either actually or constructively by attestation) shares of Common Stock having an aggregate Fair Market Value at the time of exercise equal to the Exercise Price, (iii) in any other manner then permitted by the Committee, including a cashless exercise, or (iv) by a combination of any of the permitted methods of payment. The Committee may limit any method of payment, other than that specified under clause (i), to comply with Applicable Laws or Company policy applicable to Company executives and directors.

(d) Fractional shares may not be exercised. Shares of Common Stock will be issued as soon as practical after exercise. Notwithstanding the above, the Company shall not be obligated to deliver any shares of Common Stock during any period when the Company determines that the exercisability of the Option or the delivery of shares of Common Stock hereunder would violate Company policy or any federal, state or other applicable laws.

4. EXPIRATION OF OPTION

The Option shall expire and cease to be exercisable as of the earlier of (i) the Expiration Date set forth in the Grant Notice or (ii) the date specified below in connection with the Participant's termination of employment:

(a) If the Participant's termination of employment is as a result of (i) the Company's termination of the Participant's employment without Cause, (ii) the Participant's resignation for Good Reason or (iii) the Participant's death or Disability (as defined in the Employment Agreement), the Participant (or in the event of the Participant's death, the Participant's estate) may exercise any portion of the Option that is vested and exercisable at the time of such termination of employment (after taking into account any accelerated vesting under the Grant Notice or any other agreement between the Participant and the Company) until the first anniversary of the date of the Participant's termination of employment (the "Termination Date").

(b) If the Participant's termination of employment is by the Company for Cause, the entire Option, whether or not then vested and exercisable, shall be immediately forfeited and canceled as of the Termination Date. (c) If the Participant's termination of employment is for any reason other than as set forth in Section 4(a) or 4(b), the Participant may exercise any portion of the Option that is vested and exercisable at the time of such termination of employment until the date that is 90 days following the Termination Date.

(d) Any portion of the Option that is not vested and exercisable at the time of a termination of employment (after taking into account any accelerated vesting under the Grant Notice or any other agreement between the Participant and the Company) shall be forfeited and canceled as of the Termination Date.

5. RESTRICTIONS ON SHARE TRANSFERABILITY

The Committee may impose such restrictions on any shares of Common Stock acquired pursuant to the exercise of the Option as may be required under Applicable Laws, under the requirements of any stock exchange or market upon which the Common Stock is then listed and/or traded, under any Company policy applicable to Company executives and directors, and under any blue sky or state securities laws applicable to the shares of Common Stock.

6. INCOME TAXES

As a condition to the delivery of Common Stock upon exercise of the Option, the Committee may require that the Participant, at the time of exercise, pay to the Company by cash, certified check, bank draft, wire transfer or postal or express money order an amount sufficient to satisfy any applicable tax withholding obligations, as calculated at the applicable minimum statutory rate. Subject to a determination by the Committee in good faith that the Company has sufficient available cash, the Committee will also accept payment of tax withholding obligations by the withholding of Common Stock subject to the Option or by withholding amounts due from other wages. The Committee, in consideration of applicable accounting standards, may allow the Participant to elect, or otherwise direct as a general rule, to have the Company withhold Common Stock for taxes at an amount greater than the applicable minimum statutory amount.

7. NONTRANSFERABILITY OF OPTION

Except as permitted by the Committee or as permitted under Section 14 of the Plan, the Participant may not sell, transfer, pledge, assign or otherwise alienate or hypothecate the Option, other than by will or the laws of descent and distribution, and the Option shall be exercisable only by the Participant during his or her lifetime. The Company may cancel the Option if the Participant attempts to assign or transfer it in a manner inconsistent with this Section 7.

8. OTHER AGREEMENTS SUPERSEDED

The Grant Notice, these Standard Terms and Conditions and the Plan constitute the entire understanding between the Participant and the Company regarding the Option. Any prior agreements, commitments or negotiations concerning the Option are superseded.

9. LIMITATION OF INTEREST IN SHARES SUBJECT TO OPTION

Neither the Participant (individually or as a member of a group) nor any beneficiary or other person claiming under or through the Participant shall have any right, title, interest, or privilege in or to any shares of Common Stock except as to such shares of Common Stock, if any, as shall have been issued to such person upon exercise of the Option or any part of it. Nothing in the Grant Notice or these Standard Terms and Conditions shall confer upon the Participant any right to continue in the Company's employ or service nor limit in any way the Company's right to terminate the Participant's employment at any time for any reason.

10. NO LIABILITY OF COMPANY

The Company and any affiliate which is in existence or hereafter comes into existence shall not be liable to the Participant or any other person as to: (a) the nonissuance or sale of shares of Common Stock as to which the Company has been unable to obtain from any regulatory body having jurisdiction the authority deemed by the Company's counsel to be necessary to the lawful issuance and sale of any shares hereunder; and (b) any tax consequence expected, but not realized, by the Participant or other person due to the receipt, exercise or settlement of any Option granted hereunder.

11. GENERAL

(a) In the event that any provision of these Standard Terms and Conditions is declared to be illegal, invalid or otherwise unenforceable by a court of competent jurisdiction, such provision shall be reformed, if possible, to the extent necessary to render it legal, valid and enforceable, or otherwise deleted, and the remainder of these Standard Terms and Conditions shall not be affected except to the extent necessary to reform or delete such illegal, invalid or unenforceable provision.

(b) The headings preceding the text of the sections hereof are inserted solely for convenience of reference, and shall not constitute a part of these Standard Terms and Conditions, nor shall they affect its meaning, construction or effect. Words in the masculine gender shall include the feminine gender, and where appropriate, the plural shall include the singular and the singular shall include the plural. The use herein of the word "including" following any general statement, term or matter shall not be construed to limit such statement, term or matter to the specific items or matters set forth immediately following such word or to similar items or matters, whether or not non-limiting language (such as "without limitation", "but not limited to", or words of similar import) is used with reference thereto, but rather shall be deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement, term or matter. References herein to any agreement, instrument or other document means such agreement, instrument or other document as amended, supplemented and modified from time to time to the extent permitted by the provisions thereof and not prohibited by the Plan or these Standard Terms and Conditions.

(c) These Standard Terms and Conditions shall inure to the benefit of and be binding upon the parties hereto and their respective permitted heirs, beneficiaries, successors and assigns.

(d) To the extent not preempted by federal law, these Standard Terms and Conditions shall be construed in accordance with and governed by the laws of the State of Delaware, excluding any conflicts or choice of law rule or principle that might otherwise refer construction or interpretation of these Standard Terms and Conditions to the substantive law of another jurisdiction. Notwithstanding anything in the Plan or herein, the Option, the Grant Notice and these Standard Terms and Conditions shall be subject to the arbitration provisions set forth in the Employment Agreement.

(e) In the event of any conflict between the Grant Notice, these Standard Terms and Conditions and the Plan, the Grant Notice and these Standard Terms and Conditions shall control. In the event of any conflict between the Grant Notice and these Standard Terms and Conditions, the Grant Notice shall control.

(f) All questions arising under these Standard Terms and Conditions shall be decided by the Committee in its total and absolute discretion.

(g) Notwithstanding Section 24 of the Plan, the Option shall be subject to the clawback provisions set forth in the Employment Agreement.

12. ELECTRONIC DELIVERY

By executing the Grant Notice, the Participant hereby consents to the delivery of information (including information required to be delivered to the Participant pursuant to applicable securities laws) regarding the Company and the Subsidiaries, the Option and the Common Stock via Company web site or other electronic delivery.

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Exhibit 21.1

Subsidiaries of Advanced Emissions Solutions, Arg, Inc.

Entity Name	State or Country of Organization
ACS Land Company, LLC	Delaware
ADA Analytics, LLC	Delaware
ADA Analytics Israel Ltd.	Israel
ADA Carbon Arq Solutions, LLC	Delaware
ADA Carbon Arq Solutions (Operations), LLC	Delaware
ADA Carbon Arq Solutions (Red River), LLC	Delaware
ADA Carbon Arq Solutions (Vortex IP), LLC	Delaware
ADA Carbon Arq Solutions (Vortex Operations), LLC	Delaware
ADA-ES, Arq Solutions (ES), Inc.	Colorado
ADEquity, LLC	Delaware
CarbPure Technologies, Arq Purification, LLC	Delaware
Crowfoot Supply Company, LLC	Delaware
Five Forks Mining, LLC	Delaware
FluxSorb Technologies, LLC	Delaware
Marshall Arq Series B, LLC	Delaware
Arq IP Limited	UK
Arq International Limited	UK
Arq UK Management Ltd	UK
Wharnecliffe Asset Management LLC	Delaware
Mine Four LLC	Delaware
Arq LLC	Delaware
Arq Projects Holding Company LLC	Delaware
Corbin Project LLC	Delaware
Arq Corbin Land LLC	Delaware
Arq Corbin LLC	Delaware

Each subsidiary does business under its chartered name.

EXHIBIT 23.1

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statements on Form S-3 (No. 333-276375) and Form S-8 (No. 333-143004, 333-143004, No. 333-144820, No. 333-219054, No. 333-121234, No. 333-110479, No. 333-164792, No. 333-184772, No. 333-189351, No. 333-265947, and No. 333-265947) 333-273425) of Advanced Emissions Solutions, Arq, Inc. (the "Company"), of our reports report dated March 8, 2023 March 12, 2024, relating to the consolidated financial statements of the Company and the effectiveness of internal control over financial reporting of the Company, appearing in this Annual Report on Form 10-K of the Company for the year ended December 31, 2022 December 31, 2023.

/s/ Moss Adams LLP

Denver, Colorado

March 8, 2023 12, 2024

CERTIFICATION

I, **Greg P. Marken**, **Robert Rasmus**, certify that:

1. I have reviewed this Annual Report on Form 10-K of **Advanced Emissions Solutions, Arq**, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;
3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
 - (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - (b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
 - (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: **March 8, 2023** **March 12, 2024**

/s/ **Greg P. Marken** **Robert Rasmus**

Greg P. Marken **Robert Rasmus**

Chief Executive Officer

(Principal Executive Officer)

CERTIFICATION

I, **Morgan Fields**, **Stacia Hansen**, certify that:

1. I have reviewed this Annual Report on Form 10-K of **Advanced Emissions Solutions, Arq**, Inc.;
2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;
4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:
- Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;
 - Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;
 - Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and
 - Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and
5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):
- All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and
 - Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: March 8, 2023 March 12, 2024

/s/ Morgan Fields Stacia Hansen

Morgan Fields Stacia Hansen

Chief Accounting Officer

(Principal Financial and Accounting Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO 18 U.S.C. SECTION 1350

The certification set forth below is being submitted in connection with the Annual Report on Form 10-K of Advanced Emissions Solutions, Arq, Inc. (the "Company") for the year ended December 31, 2022 December 31, 2023, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), Greg P. Marken, Robert Rasmus, as Principal Executive Officer of the Company, and Morgan Fields, Stacia Hansen, as Principal Financial and Accounting Officer of the Company, each hereby certifies, pursuant to and solely for the purpose of 18 U.S.C. §1350, as adopted pursuant to §906 of the Sarbanes-Oxley Act of 2002, to the best of his knowledge and belief, that:

- The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m or 78o(d)); and
- The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of Advanced Emissions Solutions, Arq, Inc.

/s/ Greg P. Marken Robert Rasmus

Greg P. Marken Robert Rasmus

Chief Executive Officer

Date: March 8, 2023 March 12, 2024

/s/ Morgan Fields Stacia Hansen

Morgan Fields Stacia Hansen

Chief Accounting Officer

Date: March 8, 2023 March 12, 2024

The foregoing certification is being furnished to the Securities and Exchange Commission as an exhibit to the Report and shall not be considered filed as part of the Report. Such certification will not be deemed to be incorporated by reference into any filing under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, except to the extent that the Company specifically incorporates it by reference.

EXHIBIT 95

Mine Safety and Health Administration Safety Data

We are committed to maintaining a safe work environment and working to ensure environmental compliance across all of our operations. The health and safety of our employees and limiting the impact to communities in which we operate are critical to our long-term success. We employ practices and conduct training to help ensure that our employees work safely. Furthermore, we utilize processes for managing, monitoring and improving safety and environmental performance.

The following disclosures are provided pursuant to Securities and Exchange Commission (SEC) regulations, which require certain disclosures by companies required to file periodic reports under the Securities Exchange Act of 1934, as amended, that operate coal mines regulated under the Federal Mine Safety and Health Act of 1977 (the "Mine Act"). The disclosures reflect United States (U.S.) mining operations only.

Mine Safety Information. Whenever the Mine Safety and Health Administration (MSHA) believes that a violation of the Mine Act, any health or safety standard, or any regulation has occurred, it may issue a violation which describes the associated condition or practice and designates a time frame within which the operator must abate the violation. In some situations, such as when MSHA believes that conditions pose a hazard to miners, MSHA may issue an order removing miners from the area of the mine affected by the condition until hazards are corrected. Whenever MSHA issues a citation or order, it generally proposes a civil penalty, or fine, as a result of the violation that the operator is ordered to pay. Citations and orders can be contested and appealed and, as part of that process, are often reduced in severity and amount, and are sometimes vacated. The number of citations, orders and proposed assessments vary depending on the size and type (underground or surface) of the company and mine.

We are required to report citations and orders issued to us by MSHA during the year ended **December 31, 2022** **December 31, 2023**, as reflected in our systems. Our required disclosure covers only those mines that were issued orders or citations during the period presented and, commensurate with SEC regulations, does not reflect orders or citations issued to independent contractors working at our mines. Due to timing and other factors, our data may not agree with the mine data retrieval system maintained by MSHA. The proposed assessments for the year ended **December 31, 2022** **December 31, 2023** were taken from the MSHA system as of **March 3, 2023** **March 8, 2024**.

Additional information about MSHA references we are required to report is as follows:

- *Section 104 S&S Violations:* The total number of violations received from MSHA under section 104(a) of the Mine Act that could significantly and substantially contribute to a serious injury if left unabated.
- *Section 104(b) Orders:* The total number of orders issued by MSHA under section 104(b) of the Mine Act, which represents a failure to abate a citation under section 104(a) within the period of time prescribed by MSHA. This results in an order of immediate withdrawal from the area of the mine affected by the condition until MSHA determines that the violation has been abated.
- *Section 104(d) Citations and Orders:* The total number of citations and orders issued by MSHA under section 104(d) of the Mine Act for unwarrantable failure to comply with mandatory health or safety standards.
- *Section 104(e) Notices:* The total number of notices issued by MSHA under section 104(e) of the Mine Act for a pattern of violations that could contribute to mine health or safety hazards.
- *Section 110(b)(2) Violations:* The total number of flagrant violations issued by MSHA under section 110(b)(2) of the Mine Act.
- *Section 107(a) Orders:* The total number of orders issued by MSHA under section 107(a) of the Mine Act for situations in which MSHA determined an imminent danger existed.
- *Proposed MSHA Assessments:* The total dollar value of proposed assessments from MSHA.
- *Fatalities:* The total number of mining-related fatalities.

We own a **Our first** mine **that** is located in the Gulf Coast Lignite Region, in Natchitoches Parish, Louisiana ("**Five** (the "**Five Forks Mine**"). For the year ended **December 31, 2022** **December 31, 2023**, there were no **reportable** citations or orders issued to the Five Forks Mine. **We also own a** **Our second** mine **is** located in the Gulf Coast Lignite Region, in Harrison and Panola Counties, Texas Knox, Kentucky ("**Marshall Mine**" **Corbin Project**"). For the year ended **December 31, 2022** **December 31, 2023**, there were no **reportable** citations or orders issued to **Corbin Project**. **Our third** mine is located in Mingo, West Virginia ("**Mine Four**"). For the **Marshall Mine**, year ended **December 31, 2023**, there were no **reportable** citations or orders issued to **Mine Four**.

Pending Legal Actions. The Federal Mine Safety and Health Review Commission (the "Commission") is an independent adjudicative agency that provides administrative trial and appellate review of legal disputes arising under the Mine Act. These cases may involve, among other questions, challenges by operators to citations, orders and penalties they have received from MSHA, or complaints of discrimination by miners under section 105 of the Mine Act. The following is a brief description of the types of legal actions that may be brought before the Commission.

- *Contests of Citations and Orders:* A contest proceeding may be filed with the Commission by operators, miners or miners' representatives to challenge the issuance of a citation or order issued by MSHA, including citations related to disputed provisions of operators' emergency response plans.

- *Contests of Proposed Penalties (Petitions for Assessment of Penalties):* A contest of a proposed penalty is an administrative proceeding before the Commission challenging a civil penalty that MSHA has proposed for the violation. Such proceedings may also involve appeals of judges' decisions or orders to the Commission on proposed penalties, including petitions for discretionary review and review by the Commission on its own motion.
- *Complaints for Compensation:* A complaint for compensation may be filed with the Commission by miners entitled to compensation when a mine is closed by certain withdrawal orders issued by MSHA. The purpose of the proceeding is to determine the amount of compensation, if any, due miners idled by the orders.
- *Complaints of Discharge, Discrimination or Interference:* A discrimination proceeding is a case that involves a miner's allegation that he or she has suffered a wrong by the operator because he or she engaged in some type of activity protected under the Mine Act, such as making a safety complaint. This category includes temporary reinstatement proceedings, which involve cases in which a miner has filed a complaint with MSHA stating he or she has suffered discrimination and the miner has lost his or her position.
- *Applications for Temporary Relief:* An application for temporary relief from any modification or termination of any order or from any order issued under certain subparts of section 104 of the Mine Act may be filed with the Commission at any time before such order becomes final.

For the year ended **December 31, 2022** **December 31, 2023**, there were no pending or legal actions before the Commission at **the Five Forks Mine**. Further, for the year ended **December 31, 2022**, there were no pending **Mine, Corbin Project** or legal actions before the Commission at the **Marshall Mine, Mine Four**.

Exhibit 97

Advanced Emissions Solutions, Inc.

COMPENSATION RECOUPMENT (CLAWBACK) POLICY

Recoupment of Incentive-Based Compensation

It is the policy of Advanced Emissions Solutions, Inc. (the "Company") that, in the event the Company is required to prepare an accounting restatement of the Company's financial statements due to the Company's material non-compliance with any financial reporting requirement under the federal securities laws (including any such correction that is material to the previously issued financial statements, or that would result in a material misstatement if the error were corrected in the current period or left uncorrected in the current period), the Company will recover on a reasonably prompt basis the amount of any Incentive-Based Compensation Received by a Covered Executive during the Recovery Period that exceeds the amount that otherwise would have been Received had it been determined based on the restated financial statements.

Policy Administration and Definitions

This Policy is administered by the Compensation Committee (the "Committee") of the Company's Board of Directors and is intended to comply with, and as applicable to be administered and interpreted consistent with, and subject to the exceptions set forth in, Listing Standard 5608 adopted by The Nasdaq Stock Market to implement Rule 10D-1 under the Securities Exchange Act of 1934, as amended (collectively, "Rule 10D-1").

For purposes of this Policy:

"Incentive-Based Compensation" means any compensation granted, earned, or vested based in whole or in part on the Company's attainment of a financial reporting measure that was Received by a person (i) on or after October 2, 2023 and after the person began service as a Covered Executive, and (ii) who served as a Covered Executive at any time during the performance period for the Incentive-Based Compensation. A financial reporting measure is (i) any measure that is determined and presented in accordance with the accounting principles used in preparing the Company's financial statements and any measure derived wholly or in part from such a measure, and (ii) any measure based in whole or in part on the Company's stock price or total shareholder return.

Incentive-Based Compensation is deemed to be "Received" in the fiscal period during which the relevant financial reporting measure is attained, regardless of when the compensation is actually paid or awarded.

"Covered Executive" means any "executive officer" of the Company as defined under Rule 10D-1.

“Recovery Period” means the three completed fiscal years immediately preceding the date that the Company is required to prepare the accounting restatement described in this Policy, all as determined pursuant to Rule 10D-1, and any transition period of less than nine months that is within or immediately following such three fiscal years.

If the Committee determines the amount of Incentive-Based Compensation Received by a Covered Executive during a Recovery Period exceeds the amount that would have been Received if determined or calculated based on the Company's restated financial results, such excess amount of Incentive-Based Compensation shall be subject to recoupment by the Company pursuant to this Policy. For Incentive-Based Compensation based on stock price or total shareholder return, where the amount of erroneously awarded compensation is not subject to mathematical recalculation directly from the information in an accounting restatement, the Committee will determine the amount based on a reasonable estimate of the effect of the accounting restatement on the relevant stock price or total shareholder return. In all cases, the calculation of the excess amount of Incentive-Based Compensation to be recovered will be determined without regard to any taxes paid with respect to such compensation. The Company will maintain and will provide to The Nasdaq Stock Market documentation of all determinations and actions taken in complying with this Policy. Any determinations made by the Committee under this Policy shall be final and binding on all affected individuals.

The Company may effect any recovery pursuant to this Policy by requiring payment of such amount(s) to the Company, by set-off, by reducing future compensation, or by such other means or combination of means as the Committee determines to be appropriate. The Company need not recover the excess amount of Incentive-Based Compensation if and to the extent that the Committee determines that such recovery is impracticable, subject to and in accordance with any applicable exceptions under The Nasdaq Stock Market listing rules, and not required under Rule 10D-1, including if the Committee determines that the direct expense paid to a third party to assist in enforcing this Policy would exceed the amount to be recovered after making a reasonable attempt to recover such amounts. The Company is authorized to take appropriate steps to implement this Policy with respect to Incentive-Based Compensation arrangements with Covered Executives.

Any right of recoupment or recovery pursuant to this Policy is in addition to, and not in lieu of, any other remedies or rights of recoupment that may be available to the Company pursuant to the terms of any other policy, any employment agreement or plan or award terms, and any other legal remedies available to the Company; provided that the Company shall not recoup amounts pursuant to such other policy, terms or remedies to the extent it is recovered pursuant to this Policy. The Company shall not indemnify any Covered Executive against the loss of any Incentive-Based Compensation (or provide any advancement of expenses in such instance), including any payment or reimbursement for the cost of third-party insurance purchased by any Covered Executives to fund potential recovery obligations under this Policy.

ADVANCED EMISSIONS SOLUTIONS, INC.
COMPENSATION RECOUPMENT (CLAWBACK) POLICY
ACKNOWLEDGEMENT AND ACCEPTANCE FORM

By signing below, the undersigned covered executive (the “Covered Executive”) acknowledges and confirms that the Covered Executive has received and reviewed a copy of the Advanced Emissions Solutions, Inc. Compensation Recoupment (Clawback) Policy (as interpreted or modified from time to time pursuant to the terms hereof, the “Policy”), and in addition, the Covered Executive acknowledges and agrees that, for good and valid consideration, including continuing participation in the Company's incentive compensation programs, including the Company's 2022 Omnibus Incentive Plan and Short-Term Incentive Plan, the receipt and sufficiency of which the Covered Executive hereby acknowledges, the Covered Executive will be bound by and abide by the Policy as follows:

- a. the Covered Executive is and will continue to be subject to the Policy and the Policy will apply both during and after the Covered Executive's employment with the Company;
- b. to the extent necessary to comply with the Policy, the Company hereby amends any employment agreement, equity award agreement or similar agreement that the Covered Executive is a party to with the Company;
- c. the Covered Executive shall abide by the terms of the Policy, including, without limitation, by returning any compensation to the Company to the extent required by, and in a manner permitted by, the Policy, and understands and agrees that the Covered Executive shall not be entitled to any (i) indemnification for any liability (including any amounts owed by the Covered Executive in a judgment or settlement of any Clawback Proceeding (as defined below)), or loss (including judgments, fines, taxes, penalties or amounts paid in settlement by or on behalf of the Covered Executive) incurred by the Covered Executive in connection with or as a result of any action taken by the Company's Board of Directors (the “Board”) or a duly authorized committee of the Board (the “Committee”) to enforce the Policy (such action, a “Clawback Proceeding”) or (ii) indemnification or advancement of any expenses (including attorneys' fees) from the Company and or any subsidiary of the Company incurred by the Covered Executive in connection with any Clawback Proceeding; provided, however, if the Covered Executive is successful on the merits in the defense of any claim asserted against the Covered Executive in a Clawback Proceeding, the Covered Executive shall be indemnified for the expenses (including attorneys' fees) the Covered Executive reasonably incurred to defend such claim;
- d. any amounts payable to the Covered Executive shall be subject to the Policy as may be in effect and interpreted or modified from time to time in the sole discretion of the Board or the Committee or as required by applicable law or the requirements of any securities exchange on which the Company's securities are listed, and that such interpretation or modification will be covered by this acknowledgment;

e. the Company may recover compensation paid to the Covered Executive through any method of recovery the Committee or its delegate deems appropriate, including without limitation by reducing any amount that is or may become payable to the Covered Executive, and the Covered Executive agrees to comply with any request or demand for repayment by the Company in order to comply with the Policy;

f. the Company is not responsible for and shall not make the Covered Executive whole for any effect under any tax law or regulation of the recovery of any compensation

pursuant to the Policy, or for any taxes paid by the Covered Executive on compensation that is subject to recovery or is recovered pursuant to the Policy; and the Covered Executive hereby knowingly, voluntarily and intentionally waives, and agrees not to assert any claim regarding, any and all rights to indemnification, advancement and other rights from the Company or any subsidiary of the Company to which the Covered Executive is now or may become entitled under any indemnification agreement between the Covered Executive and the Company (including any provisions related to non-exclusivity of rights contained therein), the Company's Certificate of Incorporation and Bylaws, as amended, the governing documents of each subsidiary of the Company and the Delaware General Corporation Law, in each case to the extent such waiver and agreement is necessary to give effect to the preceding provisions of this paragraph.

Signature

Print Name

Date

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