

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, 2021

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.

(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	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 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.

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 \$122.6 million based on the last reported bid price of the Common Stock on the Nasdaq Global Market on June 30, 2021. The number of shares outstanding of the registrant's Common Stock, par value \$0.001 per share, as of February 25, 2022 was 18,841,000.

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, INC.
ANNUAL REPORT ON FORM 10-K
FOR THE FISCAL YEAR ENDED DECEMBER 31, 2021

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PART I

Item 1. Business

General

ADA-ES, Inc. ("ADA"), a Colorado corporation, was incorporated in 1997. Pursuant to an Agreement and Plan of Merger, effective July 1, 2013, 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. In 2018, we acquired ADA Carbon Solutions, LLC ("Carbon Solutions") as a means to enter into the broader activated carbon ("AC") market and to expand our product offerings in the mercury control industry and other applicable activated carbon markets. 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 and its consolidated subsidiaries.

We sell consumable products that utilize AC 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, 2021 and 2020, we held equity interests of 42.5% and 50.0% in Tinum Group, LLC ("Tinum Group") and Tinum Services, LLC ("Tinum Services"), respectively, which are both unconsolidated entities, and historically have both contributed significantly to our financial position and results of operations. We account for Tinum Group and Tinum 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 Tinum Group and Tinum Services have substantially ceased operations as of December 31, 2021, and Tinum Group is in the process of completing reclamation activities. See further discussion below under "Segments - RC" of this item.

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 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 can be specifically engineered to selectively target various contaminants to meet end-use application requirements. AC can come in several different forms that are important for the end-use application, including powdered activated carbon ("PAC"), granular activated carbon ("GAC"), pellets, honeycombs, blocks or cloths.

Key markets include removal of pollutants from coal-fired electrical generation and other industrial processes, treatment of drinking and waste waters, industrial acid gas 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 and air purification, especially in the developed and more industrialized areas of the world. Additionally, we believe environmental issues will continue to drive demand for AC in rapidly developing countries.

We see opportunities and are continuing to pursue diverse 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 drinking water quality across North America. Activated carbon, in various forms, has and will continue to play a key role in these remediation efforts.

Segments

Advanced Purification Technologies

In our Advanced Purification Technologies ("APT") segment, our AC and chemical products are used to purify contaminated liquid and gas streams from a variety of industrial sources including coal-fired power plants and waste-water treatment plants, among others. Most of the North American coal-fired power generators installed equipment to control air pollutants, such as mercury, prior to or since the inception 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 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 that utilizes the consumables solutions that fit with their unique operating and pollution control configuration.

For the purification of water, AC has been used in the treatment of drinking water, wastewater, contaminated soil and groundwater to adsorb compounds causing unpleasant taste and odor and other contaminants. Both industrial and municipal wastewater treatment plants have deployed the use of AC 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. The existing technologies for treatment, 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 and may have complicated life-cycle management requirements. 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™, that is currently in the process of or planning stages of in-field testing at multiple contaminated soil and groundwater remediation treatment sites.

Coal-fired power plants continue to be a significant, though declining, source of electricity in the United States. Demand for our AC products related to coal-fired electricity generation is dependent on the availability and cost of alternative energy sources, such as natural gas, solar and wind energy. We see opportunities to continue pursuing diverse markets for our purification products outside of coal-fired power generation, including industrial applications, water treatment plants and other markets. We believe the Supply Agreement with Cabot, as discussed below, will drive adoption of our AC products by customers in some of those diverse end-markets.

Sales and Customers

Sales of consumables are primarily made by the Company's employees to a range of end customers, including coal-fired utilities, industrial companies, water treatment plants and other customers. Our AC sales are generally made under requirements-based contracts ranging from one to five years. Our chemical product sales are generally made on a purchase order by purchase order basis. Revenues from our top three customers comprised approximately 37% of our consolidated consumables revenues for the year ended December 31, 2021, and the loss of any of these customers would have a material adverse effect on our operating results.

Cabot Supply Agreement and Related Agreements

On September 30, 2020, we and Cabot Norit Americas, Inc., ("Cabot") entered into a supply agreement (the "Supply Agreement") pursuant to which we agreed to sell and deliver to Cabot, and Cabot agreed to purchase and accept from us, certain lignite-based activated carbon 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.

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.

As a condition to entering into the Supply Agreement, on September 30, 2020, we entered into an agreement to purchase (the "Mine Purchase Agreement") from Cabot 100% of the membership interests in Marshall Mine, LLC (the "Marshall Mine Acquisition"), which owns a lignite mine located outside of Marshall, Texas (the "Marshall Mine"), for a nominal cash purchase price. Immediately after completion of the Mine Purchase Agreement, we independently determined to commence activities to shutter the Marshall Mine, and we will incur the associated reclamation costs as further described below.

In conjunction with the execution of the Supply Agreement and the Mine Purchase Agreement, on September 30, 2020, we entered into a reclamation contract (the "Reclamation Contract") with a third party that provides a capped cost, subject to certain contingencies, in the initial amount of approximately \$19.7 million plus an obligation to pay certain direct costs of approximately \$3.6 million (collectively, the "Reclamation Costs") over the estimated reclamation period of 10 years. Under the terms of the Supply Agreement, Cabot is obligated to reimburse us for approximately \$10.2 million of the Reclamation Costs (the "Reclamation Reimbursements"), which are payable semi-annually over 13 years and inclusive of interest.

As the owner of the Marshall Mine, we were required to post a surety bond to ensure performance of our reclamation activities under the Surety Bond Indemnification Agreement (the "Surety Agreement"). As of December 31, 2021, we posted a surety bond of \$16.6 million.

On February 1, 2021, we and a subsidiary of Cabot Corporation, Cabot Norit Nederland B.V. ("Cabot Corporation") entered into a five-year supply agreement ("EMEA Supply Agreement") to supply Cabot Corporation with lignite activated carbon products and other proprietary products used for mercury removal in utility and industrial coal-fired power plants in the EMEA market (as defined below). Cabot Corporation will be the exclusive and sole reseller of these products within Europe, Turkey, the Middle East and Africa ("EMEA"), and we will have a first right to provide the products to Cabot for sale in the EMEA market.

Competition

Our primary competitors for consumable sorbent products include Cabot (CBT), Calgon Carbon, a subsidiary of Tokyo Stock Exchange listed Kuraray Co., Ltd., Donau Carbon Company, Midwest Energy Emissions Corp. (MEEC) and Nalco Holding Company, a subsidiary of Ecolab Inc. (ECL).

Raw Materials

The principal raw material we use in the manufacturing of AC is lignite coal, which is readily available. We supply 100% of the lignite coal through our ownership of the Five Forks Mine ("Five Forks") to fulfill customer orders. Five Forks is operated for us by Demery Resources Company, LLC ("Demery"), 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 AC certain markets.

We purchase various additives utilized in the production of AC. The manufacturing of AC is dependent upon these various additives that 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 products is dependent upon certain discrete additives that 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. Supply agreements with these producers are generally renewed on an annual basis.

Operations

We own and operate the Red River plant which is located in Louisiana. We also lease land in which operate a manufacturing and distribution facility located in Louisiana. Additionally, we have sales, product development and administrative operations located in Colorado.

Refined Coal ("RC")

Through December 31, 2021, Tinum Group provided reduction of mercury and nitrogen oxide ("NO_x") emissions at select coal-fired power generators through the production and sale of RC that qualified for Section 45 tax credits. We benefited from Tinum Group's production and sale of RC from our share of earnings from Tinum Group's sales or leases of RC facilities to tax equity investors. As noted above, the Section 45 tax credit period expired on December 31, 2021 and both Tinum Group and Tinum Services substantially ceased operations as of that date. Tinum Group is performing reclamation at its RC facilities and, along with Tinum Services. As such, our earnings and distributions from our RC segment substantially ceased as of December 31, 2021, and this will have a material adverse effect on our results of operations and financial position beginning in 2022. See the separately filed financial statements of Tinum Group included in Item 15 - "Exhibits, Financial Statement Schedules" ("Item 15") of this Report.

Products

Our patented M-45™ and M-45-PC™ technologies (collectively, the "M-45 Technology") are proprietary pre-combustion coal treatment technologies used to control emissions of nitrogen oxides ("NO_x") and mercury from coals burned in circulating fluidizer bed boilers and pulverized coal boilers, respectively.

Our patented CyClean™ technology, a pre-combustion coal treatment process provides electric power generators the ability to enhance combustion and reduce emissions of NO_x and mercury from coals burned in cyclone boilers.

Our patents related to the RC segment are not expected to have significant commercial application beyond December 31, 2021 primarily due to the wind down of Tinum Group and Tinum Services as a result of the expiration of the Section 45 tax credit period.

Sales and Customers

Through December 31, 2021 we earned royalties ("M-45 Royalties") under a licensing arrangement with Tinum Group for those RC facilities that utilized the M-45 Technology to treat coal for the reduction of emissions of both NO_x and mercury. With the closure of all of the RC facilities as of December 31, 2021, we will no longer earn M-45 Royalties and the loss of this revenue stream will have a material adverse effect on our results of operations and financial position beginning in 2022. For the year ended December 31, 2021, M-45 Royalties comprised 14% of our total consolidated revenues and approximately 296% of our total consolidated operating income. M-45 Royalties are recognized based upon a percentage of the per-ton, pre-tax margin as defined in the M-45 License.

For 2021 and 2020, we also derived substantial earnings in the RC segment from our equity method investments in Tinum Group and Tinum Services. Additional information related to major customers is disclosed in Note 21 of the Consolidated Financial Statements included in Item 8 of this Report.

Historically, we generated substantial earnings and cash distributions from our ownership in Tinum Group, which constructed RC facilities that were either leased or sold to tax equity investors who earned Section 45 tax credits for the production and sale of RC to utilities at their respective RC facilities. We referred to these RC facilities as "invested RC facilities."

RC facilities that produced and sold RC and were not leased or sold, but wholly or partially owned by us or Tinum Group, were referred to as "retained" RC facilities. Through our direct ownership in retained RC facilities or indirect ownership through Tinum Group, we earned Section 45 tax credits at retained RC facilities for the RC that was produced and sold to utilities. For the years ended December 31, 2021 and 2020, we earned \$0.4 million and \$0.4 million of Section 45 tax credits, respectively. As of December 31, 2021, we have cumulatively earned substantial tax credits from certain retained RC facilities, but have not been able to fully utilize them. See Note 18 to our Consolidated Financial Statements included in Item 8 - "Financial Statements and Supplementary Data" ("Item 8") of this Report for additional information regarding our tax credits and other deferred tax assets.

Through December 31, 2021, Tinum Services operated and maintained RC facilities under operating and maintenance agreements with owners or lessees of these RC facilities.

The following table provides summary information related to the Company's investment in Tinum Group and the related RC facilities as of December 31, 2021 and tons of RC produced and sold for the year ended December 31, 2021:

	# of RC Facilities	Not Operating	Operating	
			Invested	Retained
RC Facilities	26	26	—	—
RC tons produced and sold (000's)			64,455	144

The following table provides summary information related to the Company's investment in Tinum Group and the related RC facilities as of December 31, 2020 and tons of RC produced and sold for the year ended December 31, 2020:

	# of RC Facilities	Not Operating	Operating	
			Invested	Retained
Facilities	26	3	23	—
RC tons produced and sold (000's)			64,982	693

Raw Materials

The principal raw materials used in our RC products were comprised of non-bromine based halogens.

Operations

Tinum RC facilities were located at coal-fired power plants in the U.S.

Research and Development Activities

We have conducted research and development directed towards product development related to the Supply Agreement and other markets. During the years ended December 31, 2021 and 2020, we incurred expenses of \$0.4 million and \$1.0 million, respectively.

Legislation and Environmental Regulations

Our products and services, as well as Tinum Group's production and sale of RC, are used for the reduction of pollutants and other contaminants. Legislation and regulation limit the amount of pollutants and other contaminants permitted and may increase the need for our product. Below is a summary of the primary legislation and regulation that affects the market for our products.

U.S. Federal Mercury and Air Toxic Standards ("MATS") Affecting Electric Utility Steam Generating Units

The U.S. Environmental Protection Agency ("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 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 ("HCl") 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 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% of the coal-fired units that were operating in December 2012 when the MATS Rule was finalized have been permanently shut down, leaving approximately 518 units in operation in the U.S. at the end of 2021.

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, 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 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, 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, which 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 of the industrial boiler MACT ("IBMACT") and proposed amendments to the version published January 31, 2013, representing technical corrections and clarifications. The proposed amendments do not affect the applicability of the final rule.

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 intends to issue a proposed rule for public comment in Fall of 2022.

Additional U.S. Legislation and Regulations

In 2015, the EPA finalized rules to reduce greenhouse gases ("GHGs") in the form of the Clean Power Plan ("CPP"), which established guidelines for states to follow in developing plans to reduce GHG emissions 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, and dismissed the case once the EPA repealed the CPP in July 2019.

The EPA repealed the CPP and replaced it with the Affordable Clean Energy ("ACE") 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 for fossil fuel-fired power plants.

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 Minimata 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.

Based on the existing and potential regulations, we believe the international market for mercury control products may expand in the coming years. We believe the EMEA Supply Agreement with Cabot will help facilitate positioning our patent portfolio and existing commercial products in the EMEA region.

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 during their term, many of these bonds are renewable on an annual basis and collateral requirements may change. As of December 31,

2021, we posted a surety bond of approximately \$7.5 million for reclamation of the Five Forks Mine and \$16.6 million for the reclamation of Marshall Mine.

Patents

As of December 31, 2021, we held 83 U.S. patents and 12 international patents that were issued or allowed, 15 additional U.S. provisional patents or applications that were pending, and two international patent applications that were either pending or filed relating to different aspects of our technology. Our existing patents generally have terms of 20 years from the effective date of filing, with our next patents expiring beginning in 2022.

Seasonality of Activities

The sale of our consumable products depends on the operations of the power generation units and industrial facilities 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 in which an outage may occur, which may range 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 where these products are utilized. 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.

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, 2021, we employed 139 personnel, 27 in Colorado and 112 in Louisiana, all of which were employed full-time.

Available Information

Our periodic and current reports are filed with the Securities and Exchange Commission ("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.advancedemissionssolutions.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 found in this Part I and under the heading in Part II, Item 7 below. Words or phrases such as "anticipates," "believes," "expects," "intends," "plans," "estimates," "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) expected growth or contraction in and potential size of our target APT markets, including the water purification, food and beverage and pharmaceuticals markets;
- (b) the anticipated effects from the increase in pricing of our APT products;
- (c) expected supply and demand for our APT products and services;
- (d) increasing competition in the APT market;
- (e) the timing and effects of our review of strategic alternatives;
- (f) future level of research and development activities;
- (g) the effectiveness of our technologies and the benefits they provide;
- (h) probability of any loss occurring with respect to certain guarantees made by Tinnuum Group;
- (i) the timing of awards of, and work and related testing under, our contracts and agreements and their value;
- (j) the timing and amounts of or changes in future revenues, royalties earned, 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;
- (k) the amount of future capital expenditures needed for our business;
- (l) awards of patents designed to protect our proprietary technologies both in the U.S. and other countries;
- (m) the adoption and scope of regulations to control certain chemicals in drinking water; and
- (n) opportunities to effectively provide solutions to U.S. coal-related businesses to comply with regulations, improve efficiency, lower costs and maintain reliability.

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) Cabot will continue to purchase Furnace Products from us under the Supply Agreement in the quantities specified;
- (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 APT 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.

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; our inability to commercialize our APT technologies on favorable terms; our inability to ramp up our operations to effectively address recent and expected growth in our APT business; loss of key personnel; availability of materials and equipment for our businesses; intellectual property infringement claims from third parties; pending litigation; as well as other factors relating to our business, as described in our filings with the SEC, with particular emphasis on the risk factor disclosures contained in those filings and in Item 1A - "Risk Factors" of this Report. 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, 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

As of December 31, 2021, earnings in our RC segment have substantially ended and beginning in 2022, we will be solely dependent on earnings from our APT segment to fund our operations. We will need to grow the earnings from our APT segment substantially to make up for the loss of earnings of our RC segment.

The Section 45 tax credit period expired on December 31, 2021. As a result, both Tinum Group and Tinum Services have substantially ceased operations and we expect to receive limited, final distributions from each during the first half of 2022. Substantially all of our earnings and cash flows in 2021 and 2020 were comprised of equity method earnings from Tinum Group and M-45 Royalties generated from certain of Tinum Group's invested RC facilities. For the year ended December 31, 2021, our RC segment generated segment operating income of \$82.6 million.

From an earnings standpoint, our APT segment must grow substantially, either organically or through acquisition, in order to replace earnings from our RC segment. There can be no assurance that we will be able to increase our APT segment earnings during 2022 or 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 our RC segment was operating. We do not expect our overall selling, general and administrative portions of our operating expenses to materially decrease in 2022 as a result of the wind down of our RC segment. If we are not able to cover operating expenses, we could be forced to raise additional capital, significantly reduce our operating expenses or take other alternative actions.

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

Tinum Group 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 Tinum Group's obligations under those leases. Any substantial payments made under such guarantees could have a material adverse effect on our financial condition, results of operations and cash flows.

We are reviewing strategic alternatives and there can be no assurance that we will be successful in identifying or completing any strategic transaction, that any such strategic transaction will result in additional value for our stockholders or that the process will not have an adverse impact on our business.

We have announced that our board of directors has initiated a strategic review to assess a range of strategic alternatives to maximize shareholder value. No timetable has been set for completion of this process, and there can be no assurance that the review of strategic alternatives will result in the identification or consummation of any transaction. The process of reviewing strategic alternatives may be time consuming and disruptive to our business operations and, if we are unable to effectively manage the process, our business, financial condition and results of operations could be adversely affected. We have and will continue to incur substantial expenses associated with identifying, evaluating and negotiating potential strategic alternatives. There can be no assurance that any potential transaction or other strategic alternative, if consummated, will provide greater value to our stockholders than that reflected in the current price of our common stock. Until the review process is concluded, 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 may make it more difficult for us to attract and retain qualified personnel and business partners.

Our inability to meet customer supply requirements due to damage to or insufficient production capacity of our Red River manufacturing facility 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, which is our sole manufacturing plant for producing and selling products to our customers. Our 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. 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 the Red River Plant was destroyed or damaged in a significant manner, 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 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 due to Red River Plant downtime or having to meet customer requirements that exceed its 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.

Governmental regulations requiring mandatory COVID-19 vaccination of employees could have a material adverse impact on our business and results of operations

On September 9, 2021, President Biden issued Executive Order 14042 (the "Executive Order") requiring all employers with U.S. Government contracts to ensure that their U.S.-based employees, contractors, and subcontractors that work on or in support of U.S. Government contracts are fully vaccinated by December 8, 2021. The executive order includes on-site and remote U.S.-based employees, contractors and subcontractors and it only permits limited exemptions for medical and religious reasons. The Executive Order is facing legal challenges and currently is enjoined nationwide.

Removal of the injunction of the Executive Order or additional vaccine mandates may be announced in jurisdictions in which our business operates. Our implementation of these required policies may result in employee attrition, including attrition of critically skilled labor, and difficulty securing future labor needs, which could have a material adverse effect on our business, financial condition and results of operations.

The COVID-19 pandemic is expected to continue to affect and pose risks to our business and other epidemics or outbreaks of infectious diseases may have a similar impact.

The COVID-19 pandemic has resulted in significant volatility in the general economy. International, federal, state and local public health and governmental authorities have taken extraordinary actions to contain and combat the outbreak and spread of COVID-19, including travel bans, quarantines, "stay-at-home" orders and similar mandates that caused many individuals to substantially restrict their daily activities and many businesses to curtail or cease normal operations. While certain governments eased restrictions during the balance of 2020 and 2021, the pandemic remains disruptive to our business operations.

We may not be able to operate at optimal levels of efficiency given new work rules and procedures that were or will be implemented to protect our employees, as well as potential increased absenteeism as a result of community spread of COVID-19. Any suspension of production at our manufacturing facility, or difficulties or inefficiencies in resuming or increasing production, is likely to adversely impact our future results of operations, financial condition and liquidity, and that impact may be material. Furthermore, COVID-19 and related supply chain disruptions have impacted and may further impact our ability to efficiently operate and may lead to production delays or increased costs of production.

While we are unable to accurately predict the full impact that COVID-19 will have on our results of operations, financial condition, liquidity and cash flows due to continued uncertainties, including the duration and severity of the pandemic and containment measures, our compliance with these measures has impacted our day-to-day operations and could continue to affect our business and operations, as well as that of our key customers, suppliers and other counterparties, for an indefinite period of time. The disruptions to our operations caused by COVID-19 have resulted and are expected to continue to result in inefficiencies, delays and additional costs in our manufacturing, sales, marketing, and customer service efforts that we cannot fully mitigate through remote or other alternative work arrangements.

The situation surrounding the COVID-19 pandemic remains fluid. The ultimate impact of the COVID-19 pandemic on our results of operations, financial condition and liquidity will depend on future developments, some of which are beyond our knowledge or control. These include the duration and scope of the pandemic, travel restrictions, government mandated

restrictions and regulations, business and workforce disruptions, the impact on demand for our products, the effectiveness of actions taken to contain and treat the disease, including the efficacy of and ability to widely distribute vaccinations and therapeutics, and whether the pandemic leads to recessionary conditions in any of our key markets. We will continue to evaluate the nature and extent of the impact of COVID-19 to our business.

Demand for our products and services depends significantly on environmental laws and regulations. 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 present and expected environmental laws and regulations, particularly those addressing the reduction of mercury and other emissions from coal-fired electricity generating units. 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:

- a. 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 of rule-making by the EPA has negatively impacted our business, results of operations and financial condition and will likely continue to do so.
- b. 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") may not allow utilities to charge consumers for, and pass on the cost of, emissions control technologies without federal or state mandates. 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.

Action by the EPA related to MATS that decreases demand for our mercury removal products could have a material adverse effect on our APT segment.

Performance in our APT segment 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 HAP 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. 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. 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 the financial results of our APT segment. The timing and content of the final reconsideration 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 activated carbon 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 APT segment.

Our APT segment faces competition in the U.S. from low-priced imports of activated carbon 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 the earnings of our APT segment. 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 activated carbon products from China. In 2018, the order was extended for an additional five years. The amount of anti-dumping duties collected on imports of steam activated carbon 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 activated carbon imports in the U.S., which could negatively affect demand and/or pricing for our AC 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 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 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 has been displacing 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 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 our largest customers could adversely affect our business, financial condition or results of operations.

During the year ended December 31, 2021, we derived approximately 50% of our total consumable revenues from our five largest customers. Our top three customers accounted for approximately 37% of our total consumable revenue for our last fiscal year. 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.

Volatility in price and availability of raw materials can significantly impact our 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 obtain 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 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. 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. At the Marshall Mine, the current risks are primarily operational risks associated with the maintenance and operation of the heavy equipment. The failure to adequately manage these risks could result in significant personal injury, loss of life, equipment, 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, our 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. 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, and 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, we cannot ensure costs incurred to develop new products will result in an increase in revenues. Additionally, 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. These factors or delays could affect our future operating results.

We may not be successful in realizing the benefits associated with our acquisitions, dispositions and strategic partnerships, and our business could be adversely affected.

We have and may in the future expand the our scope of products, services, and technologies through selective acquisitions, investments or creating partnerships and joint ventures. We may also dispose of assets or portions of our business that no longer complement our long-term strategic objectives. We continually evaluate potential acquisition, disposition, and strategic partnership opportunities in the ordinary course of business. Acquisitions, dispositions, and strategic partnerships involve numerous risks, including among others:

- inability to negotiate favorable prices and terms;
- incorrect evaluations of the synergies and/or long-term benefits of the acquisition, disposition, and strategic partnership;
- integration difficulties, including challenges and costs associated with implementing systems, processes and controls to comply with the requirements of a publicly-traded company;
- diverting management's attention;
- litigation arising from acquisition and disposition activity;
- potential increased debt leverage;
- potential issuance of dilutive equity securities;
- entering markets in which we have no or limited direct prior experience and where competitors in such markets have stronger market positions;
- unanticipated costs and exposure to undisclosed or unforeseen liabilities or operating challenges;
- potential goodwill or other intangible asset impairments;
- potential requirements to provide transition services in connection with a disposition, which may result in the diversion of resources and focus of management and employees;

- potential loss of key employees and customers of the acquired businesses, product or service lines, assets or technologies;
- our ability to properly establish and maintain effective internal controls over an acquired company; and
- increasing demands on our operational and IT systems.

The success of an acquisition, disposition or strategic partnership is not always predictable, and we may not be successful in realizing our objectives as anticipated, and our business may be adversely affected as a result.

Natural disasters could affect our operations and financial results.

We operate facilities, including the Red River Plant and Five Forks Mine, 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.

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, in certain instances, 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 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 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 Tinnuum 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 are 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 business segments 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" could limit our ability to utilize tax loss and credit carryforwards to offset future taxable income.

We have certain general business credit tax credits ("Tax Credits"). As of December 31, 2021, 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 taxable income may be significantly limited if we experience an "ownership change" as discussed below. Under the Internal Revenue Code ("IRC") and regulations promulgated by the U.S. Treasury Department, we may carry forward or otherwise utilize the Tax Credits in certain circumstances to offset any current and future taxable income, and thus reduce our federal income tax liability, subject to certain requirements and restrictions. To the extent that the Tax Credits do not otherwise become limited, we believe that we will have available a significant amount of Tax Credits in future years, and therefore the Tax Credits could be a substantial asset to us. However, if we experience an "ownership change," as defined in Sections 382 and 383 of the IRC, 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 therefore significantly impair the value of that asset.

In general, an "ownership change" under Sections 382 and 383 occurs if the percentage of stock owned by an entity's 5% stockholders (as defined for tax purposes) 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 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 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 Sections 382 and 383 of the IRC would depend on the value of our equity at the time of any ownership change. If we were to experience an "ownership change," it is possible that a significant portion of our tax credit carryforwards could expire before we would be able to use them to offset future taxable income.

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 Tax Credits to reduce potential future federal income tax obligations may become substantially limited. On April 9, 2021, the Board approved the Fourth Amendment to the TAPP ("Fourth Amendment") that amends the TAPP, as previously amended by the First, Second and Third Amendments that were approved the Board on April 6, 2018, April 5, 2019 and April 9, 2020, respectively. The Fourth Amendment amends the definition of "Final Expiration Date" under the TAPP to extend the duration of the TAPP and makes associated changes in connection therewith. At the Company's 2021 annual meeting of stockholders, the Company's stockholders approved the Fourth Amendment, thus the Final Expiration Date will be the close of business on December 31, 2022.

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.

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. actual or anticipated fluctuations in our operating results and financial condition;
- b. changes in laws or regulations and court rulings and trends in our industry;
- c. announcements of sales awards;
- d. changes in supply and demand of components and materials;
- e. adoption of new tax regulations or accounting standards affecting our industry;
- f. changes in financial estimates by securities analysts;
- g. perceptions of the value of corporate transactions;
- 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, 2020 to December 31, 2021, the closing price of our common stock ranged from \$3.76 to \$12.49 per share. In June 2017, we commenced a quarterly cash dividend program and paid out cash dividends in each succeeding quarter through March 31, 2020. In 2018, we implemented stock repurchase programs, and repurchased a total of 20,613 shares of our common stock for the fiscal years 2021 and 2020 for cash of \$0.2 million.

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.

With the ceasing of our cash-generating RC segment, 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) 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") 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.

Item 1B. Unresolved Staff Comments

None.

Item 2. Properties***Office and Facilities***

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

We own our manufacturing plant, which is located on approximately 59 acres in Coushatta, Louisiana. We also lease 6.9 acres in Natchitoches Parish, Louisiana where we operate a manufacturing and distribution facility.

The APT segment of our business utilizes all of our office and facilities space.

Mining

The APT segment of our business utilizes all of our mining and mining-related properties.

As of December 31, 2021, we owned or controlled primarily through long-term leases approximately 4,425 acres of coal land for surface mining. Of those acres, approximately 1,975 acres are 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 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 at the time 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 coal land for surface mining) pertain to the Marshall Mine, which is located in Harrison and Panola Counties, Texas. Mining operations on this land ceased in the third quarter of 2020.

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 14 "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, 2021, 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 payment in March 2020. Currently, we do not plan to recommence a quarterly cash dividend program in the near term.

In the future, we may declare and pay a cash dividend on shares of our common stock. Whether we do, however, and the timing and amounts of dividends will be subject to approval and declaration by the Board and will depend on a variety of factors including, but not limited to, our financial results, cash requirements, financial condition and other contractual restrictions and other factors considered relevant by the Board, and will be subject to limitations imposed under Delaware law.

Holders

The number of holders of record of our common stock as of February 25, 2022 was approximately 900. The approximate number of beneficial stockholders is estimated at 7,800.

Purchases of Equity Securities by the Company and Affiliated Purchasers

We had no repurchases of our common stock for the three months ended December 31, 2021.

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 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, 2021, \$7.0 million of shares of our common stock remained outstanding for repurchase under the Stock Repurchase Program, which will remain in effect until all amounts are utilized or it is otherwise modified by the Board.

Item 6. Reserved

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

Overview

Through December 31, 2021, we operated two segments: RC and APT. Our RC segment is comprised of our equity ownership in Tinum Group and Tinum Services, both of which are unconsolidated entities from which we generated substantial earnings. Tinum Group provides reduction of mercury and NOx emissions at select coal-fired power generators through the production and sale of RC that qualifies for Section 45 tax credits under IRC Section 45. We benefited from Tinum Group's production and sale of RC, which generated Section 45 tax credits, as well as its revenue from selling or leasing RC facilities to tax equity investors. We also earned royalties for technologies that we licensed to Tinum 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. Tinum Services operated and maintained the RC facilities under operating and maintenance agreements with Tinum Group and owners or lessees of the RC facilities. Effective December 31, 2021, the Section 45 tax credit period expired and as a result both Tinum Group and Tinum Services have substantially ceased their operations. As such, our earnings and distributions from our RC segment substantially ceased as of December 31, 2021. We expect to receive limited, additional cash distributions from Tinum Group and Tinum Services during the first half of 2022.

Our APT segment is primarily comprised of operations of our wholly-owned subsidiary, Carbon Solutions, which we acquired on December 7, 2018. We sell consumable products that utilize AC and chemical based technologies to a broad range of customers, including coal-fired utilities, industrials, water treatment plants and other diverse markets. Our primary products are comprised of AC, which is produced from lignite coal. Our AC products include 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 regulations. Additionally, we own an associated lignite mine which supplies the primary raw material for manufacturing our products.

See further discussion of our business included in Item 1 - "Business" ("Item 1") of this Report. Discussion regarding segment information is included in the discussion of our consolidated results under this Item 7. Additionally, discussion related to our reportable segments is included in Item 1 and Note 19 of the Consolidated Financial Statements, which is included in Item 8 of this Report.

We believe there are opportunities and are continuing to pursue diverse markets for our purification products outside of coal-fired power generation, including industrial applications and water. The Supply Agreement with Cabot, as discussed below, continues to expand sales of our AC products to those diverse end-markets and drive the Company's post-Refined Coal future.

Review of Strategic Alternatives

In May 2021, we announced that we had retained Ducera Partners, LLC as our financial advisor to assist in a strategic review process to assess a range of strategic alternatives to enhance value for our stockholders. We cannot provide any assurance that the exploration of strategic alternatives will result in the identification or consummation of any transaction. Similarly, any strategic decision will involve risks and uncertainties, and we cannot provide any assurance that any strategic alternative, if identified, evaluated and consummated, will provide the anticipated benefits or otherwise enhance stockholder value. The process is ongoing and our board of directors has not set a timetable for completion of the evaluation.

Drivers of Demand and Key Factors Affecting Profitability

Drivers of demand and key factors affecting our profitability differ by segment. Historically, we derived substantial earnings and cash distributions from the RC segment through our equity ownership in Tinum Group and Tinum Services as well as the royalties earned from a licensing arrangement with Tinum Group for use of our M-45 Technology. With the expiration of the Section 45 tax credit period, we will no longer generate earnings from either Tinum Group or Tinum Services. Additionally, we do not expect our overall selling, general and administrative portions of our operating expenses to materially decrease in 2022 as a result of the wind down of our RC segment.

Demand in the APT segment is driven primarily by consumables-based solutions for coal-fired power generation, municipal water treatment and other industrial customers; and since the fourth quarter of 2020, demand from Cabot's customers through the Supply Agreement discussed below. Operating results in the APT segment have been influenced by: (1) changes in our sales volumes; (2) changes in price and product mix; (3) changes related to non-integrated supply chain inputs and (4) changes in coal-fired dispatch and electricity power generation sources. For the year ended December 31, 2021, we observed significant

increases in demand for our AC product. As such, we continue to purchase inventory to meet our customer demands to supplement products manufactured at our Red River Plant.

Customer Supply Agreement

On September 30, 2020, we and Cabot entered into the Supply Agreement, pursuant to which we agreed to sell and deliver to Cabot, and Cabot agreed to purchase and accept from us, 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.

The Supply Agreement has provided material incremental volume and allowed us to capture operating cost efficiencies at our Red River manufacturing 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 markets we historically served.

Acquisition of 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 commence activities to shutter the Marshall Mine and to incur the associated reclamation costs.

In conjunction with the execution of the Supply Agreement and the Mine Purchase Agreement, on September 30, 2020, we entered into the Reclamation Contract with a third party that provides a capped cost, subject to certain contingencies, in the amount of approximately \$19.7 million plus an obligation to pay certain direct costs of approximately \$3.6 million (collectively, the "Reclamation Costs") over the estimated reclamation period of 10 years. Under the terms of the Supply Agreement, Cabot is obligated to reimburse us for approximately \$10.2 million of Reclamation Costs (the "Reclamation Reimbursement"), which are payable semi-annually over 13 years and inclusive of interest.

On February 25, 2022, we received \$10.6 million in cash from Cabot (the "Cabot 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 Cabot by its parent, Cabot Corporation. Under the Change in Control, we received from Cabot full payment of all amounts outstanding under the Reclamation Reimbursement, payment of all unbilled amounts related to certain capital expenditures incurred by us through February 28, 2022 for specific use in manufacturing Furnace Products and payment of additional Reclamation Costs (the "Cabot Reclamation Costs"). Under the Reclamation Contract, we are obligated to remit payment for the Cabot Reclamation Costs to the third party operator of Marshall Mine within a specified timeframe. We will account for the Cabot Payment in its March 31, 2022 quarter and we do not anticipate any impacts to the Supply Agreement except as described above.

As the owner of the Marshall Mine, we were required to post a surety bond to ensure performance of our reclamation activities. As of December 31, 2021, the amount outstanding under this surety bond was \$16.6 million. For the obligations due under the Reclamation Contract, we were required to post collateral of \$10.0 million.

As of June 30, 2021 and December 31, 2021, we revised our estimate of future obligations owed for reclamation of the Marshall Mine primarily based on scope reductions related to future reclamation requirements. As a result, we reduced the Marshall Mine ARO by \$1.9 million and \$0.8 million as of June 30, 2021 and December 31, 2021, respectively, and recorded a corresponding gain on change in estimate in the aggregate of \$2.7 million in the Consolidated Statements of Operations for the year ended December 31, 2021.

Settlement with Former Customer

On December 29, 2020, we and a former customer (the "Parties") reached a settlement (the "Settlement") on various litigation matters (the "Litigation Matters") that resulted in the former customer (the "Former Customer") agreeing to pay to us cash of \$2.5 million (the "Settlement Amount"), which was received on January 27, 2021. This payment was in exchange for full dissolution of all claims and counterclaims that the two Parties have asserted or could have asserted against each other in the Litigation Matters, or which have arisen or may arise against each other but are presently unknown, arising out of or related to the Litigation Matters and related to any other of the Parties' business dealings, conduct and/or transactions through the date of the Settlement, including all claims for damages, fees, costs, sanctions, or any other amounts due or to become due in connection with the foregoing. We applied the Settlement Amount cash proceeds to both an outstanding trade account

receivable and a note receivable due from the Former Customer and recognized the excess cash received as a gain from the Settlement of \$1.1 million, which is included as a reduction of operating expenses for the year ended December 31, 2020, See further discussion under "Results of Operations" under this Item 7.

Impact of COVID-19

In March 2020, the World Health Organization declared COVID-19 a global pandemic. We follow the COVID-19 guidelines from the Centers for Disease Control concerning the health and safety of our personnel, including remote working for those that have the ability to do so, sequestered employees at our plant and other health safety measures. Additionally, we have taken proactive and precautionary steps to ensure the safety of our employees, customers and suppliers, including frequent cleaning and disinfection of workspaces, property, plant and equipment, instituting social distancing measures and mandating remote working environments, where possible, for all employees.

In response to the COVID-19 outbreak, in March 2020, the federal government passed the Coronavirus Aid, Relief, and Economic Security Act (the "CARES Act"). The CARES Act provided, among other things, the deferral of payroll tax payments for all payroll taxes incurred through December 31, 2020 and created the Paycheck Protection Program ("PPP"), which was sponsored and administered by the Small Business Administration ("SBA"). In June 2020, the Paycheck Protection Program Flexibility Act of 2020 (the "PPFPA") was signed into law and established the payment dates in the event that amounts borrowed under the PPP are not forgiven. See further discussion below of the loan made to us under the PPP under the section "PPP Loan" under this Item.

We elected to defer payments of payroll taxes of \$0.4 million for the periods allowed under the CARES Act, which allowed for a deferral of 50% of the total amount to December 31, 2021 and 50% of the total amount to December 31, 2022. As of December 31, 2021, we had repaid \$0.2 million and will repay the outstanding balance by December 31, 2022.

For 2020, we incurred costs of \$0.4 million related to sequestration of certain of our employees at our Red River plant. These costs included hazard pay, lodging and meal expenses for 30 days. For 2021, we did not incur similar costs.

Our customers may also be impacted by COVID-19 pandemic as we believe the utilization of energy has changed. We cannot predict the long-term impact on our customers and the subsequent impact on our business.

Components of Revenue, Expenses and Equity Method Investees

The following briefly describes the components of revenues 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 and cost of revenues

Consumables

We sell AC and products and other chemical-based technology products to a broad range of customers, including coal-fired utilities, industrials, water treatment plants and 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 Cabot and its customers through the Supply Agreement.

License royalties, related party

We recognize license royalties under the M-45 License with Tinum Group. License royalties from our M-45 Technology are based on a percentage of the per-ton, pre-tax margin, inclusive of depreciation expense and other allocable expenses, as defined in the M-45 License. Because Section 45 tax credits from the production and sale of RC are not available to be generated after 2021 and both Tinum Group and Tinum Services significantly wound down their operations by the end of 2021, we do not expect to earn license royalties after 2021.

Other Operating Expenses

Payroll and benefits

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

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, 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.

We own a 42.5% equity interest and a 50% voting interest in Tinum Group. Our equity method earnings in Tinum Group are positively impacted when Tinum Group obtains an investor in a RC facility and receives cash payments under either a lease arrangement or sales arrangement of the RC facility. If Tinum Group operates a retained RC facility, the Company's equity method earnings are negatively impacted as operating retained RC facilities generate operating losses. However, we benefit on an after-tax basis if we are able to utilize tax credits associated with the production and sale of RC from operation of retained RC facilities by Tinum Group. These benefits, if utilized, increase our consolidated net income as a result of a reduction in income tax expense.

We own both a 50% equity and voting interest in Tinum Services, which operates and maintains RC facilities under operating and maintenance agreements. The lessee/owner of an RC facility pays Tinum Services, subject to certain limitations, the costs of operating and maintaining the RC facilities plus certain fees. Tinum Services also arranges for the purchase and delivery of certain chemical additives under chemical agency agreements necessary for the production of RC.

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 the year ended December 31, 2020, we have restated our "Revenues - Consumables" and "Cost of revenues, excluding depreciation and amortization" line items in our Consolidated Statement of Operations for the impact of previously reporting shipping and handling costs billed to our customers as a reduction to cost of revenue rather than as a component of consumables revenue. This restatement was a result of a reassessment of our accounting and presentation of shipping and handling costs billed to our customers under accounting principles generally accepted in the United States ("GAAP") in our Consolidated Statement of Operations for the year ended December 31, 2021. Historically, we have accounted for and presented shipping and handling costs billed to customers as a reduction of consumables cost of revenue rather than as a component of consumables revenue as required under *Accounting Standards Codification 606 - Revenue from Contracts with Customers*. Accordingly, we have restated both consumables revenues and consumable cost of revenues for the year ended December 31, 2020 by increasing the previously reported amounts by \$5.8 million, respectively.

For the year ended December 31, 2020, there was no impact of the restatement to previously reported amounts for gross margin, operating loss, loss before income taxes, net loss or loss per share. Further there was no impact of this error to the previously reported Consolidated Balance Sheet as of December 31, 2020 or the Consolidated Statement of Stockholders' Equity or Consolidated Statement of Cash Flows for the year ended December 31, 2020. See further discussion of this restatement in Note 2 to the Consolidated Financial Statements under Item 8 of this Report.

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, 2020 includes a discussion and analysis of our financial condition and results of operations for the year ended December 31, 2019 in Item 7 of Part II, “Management’s Discussion and Analysis of Financial Condition and Results of Operations.”

Year ended December 31, 2021 Compared to Year ended December 31, 2020

Total Revenues and Cost of Revenues

A summary of the components of revenues and cost of revenue for the years ended December 31, 2021 and 2020 is as follows:

<i>(Amounts in thousands except percentages)</i>	Years Ended December 31,		Change	
	2021	2020	(\$)	(%)
Revenues:				
Consumables	\$ 85,882	\$ 53,908	\$ 31,974	59 %
License royalties, related party	14,368	13,440	928	7 %
Other	44	15	29	193 %
Total revenues	\$ 100,294	\$ 67,363	\$ 32,931	49 %
Consumables cost of revenues, exclusive of depreciation and amortization	\$ 65,576	\$ 50,962	\$ 14,614	29 %
Other cost of revenues, exclusive of depreciation and amortization	—	(563)	563	(100)%

Consumables revenues and consumables cost of revenues

For the years ended December 31, 2021 and 2020, consumables revenue increased year over year primarily due to higher product volumes, which comprised approximately \$25.0 million of the total change in consumables revenues. Product volumes were higher in power generation primarily due to higher natural gas prices compared to the prior year, which contributed to increased utilization of coal-fired generation and increased demand for our products. In addition, product sales increased under the Supply Agreement from the prior year as we began product shipments under this agreement beginning in the fourth quarter of 2020. Total revenues also increased due to a favorable price impact of our products by approximately \$1.0 million as well as favorable product mix impact on consumables revenue of approximately \$4.1 million. Consumables revenue for 2021 also increased \$0.9 million related to an increase in shipping and handling costs billed to our customers, driven by increases in volumes and costs to ship our products.

Our gross margin, exclusive of depreciation and amortization, increased for the year ended December 31, 2021 compared to 2020 primarily due to the higher product volumes, which resulted in lower fixed costs per pound of product sold. Additionally, gross margin was positively impacted by product price increases. Offsetting these improvements for the year ended December 31, 2021, gross margin was negatively impacted by having to supplement the Red River production of our AC product, due to higher customer demand related to requirements-based contracts, with AC product purchases from third party suppliers at higher costs per pound. We expect to continue to purchase inventory from third party suppliers in 2022 due to ongoing increased demand for our products and Red River Plant capacity impacted by customer and product mix.

Consumables revenue is 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. According to data provided by the U.S. Energy Information Administration, for the year ended December 31, 2021, power generation from coal-fired power dispatch was up approximately 18.0% compared to the corresponding period in 2020. Additionally, there was an increase in total power generation from all sources of approximately 3.1% in 2021 compared to the corresponding period in 2020.

For 2022, and based on current market estimates and the expected benefits from the Supply Agreement, we believe that both consumables revenue and volumes will increase compared to 2021. We expect that consumables revenues and gross margin will be positively impacted by price increases announced in 2021 and our efforts to improve product mix to higher margin products through changes in our customer base. We anticipate that the product price increases will also help offset the increase

in operating costs from purchasing inventory from third party suppliers, as well as expected increases in pricing related to certain additives necessary for our manufacturing operations.

License royalties, related party

License royalties increased in 2021 compared to 2020 primarily due to an increase in the royalty rate per ton. This increase was primarily a result of an increase year over year in rent revenues generated from RC facilities even though the tonnage produced remained relatively flat. The tons of RC produced from RC produced using the M-45 Technology under the M-45 License were 49.3 million and 49.4 million for the year ends December 31, 2021 and 2020, respectively.

As a result of the Section 45 tax credit period ending as of December 31, 2021, both Tinum Group and Tinum Services ceased operations and, as such, we do not expect to earn M-45 License royalties after December 31, 2021.

Other cost of revenues

For the year ended December 31, 2020, we recognized a credit of \$0.6 million to Other cost of revenues related to the Settlement with the Former Customer. See further discussion below of the reversal of an allowance on a note receivable due from the Former Customer in this section under the caption "General and administrative."

Additional information related to revenue concentrations and contributions by class and reportable segment is included in the "Business Segments" section of this Item and in Note 13 and Note 19 to the Consolidated Financial Statements included in Item 8 of this Report.

Other Operating Expenses

A summary of the components of our operating expenses, exclusive of cost of revenues items (presented above), for the years ended December 31, 2021 and 2020 is as follows:

<i>(in thousands, except percentages)</i>	Years Ended December 31,		Change	
	2021	2020	(\$)	(%)
Operating expenses:				
Payroll and benefits	\$ 11,315	\$ 10,621	\$ 694	7 %
Legal and professional fees	6,260	5,585	675	12 %
General and administrative	7,060	8,228	(1,168)	(14)%
Depreciation, amortization, depletion and accretion	7,933	8,537	(604)	(7)%
Gain on change in estimate, asset retirement obligation	(2,702)	—	(2,702)	*
Impairment of long-lived assets	—	26,103	(26,103)	(100)%
Gain on settlement	—	(1,129)	1,129	(100)%
	<u>\$ 29,866</u>	<u>\$ 57,945</u>	<u>\$ (28,079)</u>	<u>(48)%</u>

* Calculation not meaningful

Payroll and benefits

Payroll and benefits expenses increased year over year primarily due to expenses of \$1.1 million related to the agreements with our executive officers and certain other key employees executed in June 2021 ("Retention Agreements") as well as \$1.3 million related to an increase in incentive expense for the year ended December 31, 2021 compared to 2020. These increases were offset by a decrease in expenses taken during the year ended December 31, 2020 of \$1.4 million associated with the resignation of a former executive officer. Additionally, payroll expense decreased by approximately \$0.5 million due to a decrease in headcount.

Legal and professional fees

Legal and professional fees increased year over year primarily due to an increase in legal and consulting fees of \$0.9 million and \$1.2 million, respectively, related to our continuing evaluation of strategic alternatives. Offsetting these increases was \$0.9 million related to a reduction in outsourced shared service costs, which included legal and general consulting contractors, and \$0.5 million in outsourced IT costs specific to the completion of the integration of Carbon Solutions in 2020.

General and administrative

General and administrative expenses decreased year over year primarily due to decreases in product development expenses of approximately \$0.6 million related to the Supply Agreement, costs incurred due to the sequestration of certain of our employees at the Red River Plant in 2020 of approximately \$0.4 million, rent and occupancy related expenses of \$0.3 million and other general and administrative expenses, including recruiting, travel and licenses and fees of approximately \$0.7 million.

Offsetting the net decrease in general and administrative expenses year over year was the offset to general and administrative expenses in 2020 from the reversal of an allowance on a note receivable from the Former Customer of \$0.4 million. See further discussion below in this section under the caption "Gain on settlement." Further increases year over year included an increase in insurance premiums of approximately \$0.4 million.

Depreciation, amortization, depletion and accretion

Depreciation and amortization expense decreased year over year primarily due to lower absorption from the drawdown of inventory, partially offset by increase in sales volumes for 2021, resulting in a decrease of depreciation expense of \$0.2 million. Further, depreciation and amortization expense decreased by approximately \$1.1 million related to a lower depreciable base for 2021 compared to 2020 as a result of an impairment charge recorded in the second quarter of 2020 which reduced the carrying value of our property, plant and equipment. Offsetting these decreases was an increase in accretion expense of \$0.6 million related to the Marshall Mine ARO and an increase in depletion expense of \$0.2 million due to increased production volume at the Five Forks Mine.

Gain on change in estimate, asset retirement obligation

As previously discussed under this Item, for the year ended December 31, 2021, we recorded a gain on change in estimate of \$2.7 million related to a reduction in scope of our estimated future reclamation efforts of the Marshall Mine.

Impairment of long-lived assets

As of June 30, 2020, we recorded an impairment charge of \$26.1 million, which is included in the Statement of Operations for the year ended December 31, 2020 and was solely attributable to our APT segment. This impairment charge was necessitated by an analysis of the carrying values of our APT segment's long-lived assets and certain other long-lived assets (the "Asset Group"), which are comprised of our manufacturing plant and related assets and our lignite mine assets, to their respective fair values.

Gain on settlement

In connection with the Settlement discussed above, the Former Customer paid us the cash Settlement Amount of \$2.5 million on January 27, 2021 in exchange for a full release of claims in the Litigation Matters. As a result of the Settlement, we recognized a gain of \$1.1 million for the year ended December 31, 2020.

Other Income (Expense), net

A summary of the components of our other income (expense), net for the years ended December 31, 2021 and 2020 is as follows:

<i>(Amounts in thousands, except percentages)</i>	Years Ended December 31,		Change	
	2021	2020	(\$)	(%)
Other income (expense):				
Earnings from equity method investments	\$ 68,726	\$ 30,978	\$ 37,748	122 %
Gain on extinguishment of debt	3,345	—	3,345	*
Interest expense	(1,490)	(3,920)	2,430	(62)%
Other	640	132	508	385 %
Total other income	<u>\$ 71,221</u>	<u>\$ 27,190</u>	<u>\$ 44,031</u>	162 %

* Calculation not meaningful

Earnings from equity method investments

The following table presents the equity method earnings by investee for the years ended December 31, 2021 and 2020:

<i>(in thousands)</i>	Years Ended December 31,		Change	
	2021	2020	(\$)	(%)
Earnings from Tium Group	\$ 61,837	\$ 24,396	\$ 37,441	153 %
Earnings from Tium Services	6,952	6,582	370	6 %
Loss from other	(63)	—	(63)	*
Earnings from equity method investments	<u>\$ 68,726</u>	<u>\$ 30,978</u>	<u>\$ 37,748</u>	122 %

* Calculation not meaningful

For the year ended December 31, 2021, we recognized \$61.8 million in equity earnings from Tium Group compared to our proportionate share of Tium Group's net income of \$40.1 million for the year. The difference between our pro-rata share of Tium Group's net income and our earnings from Tium Group equity method investment as reported on the Consolidated Statements of Operations is the result of cumulative distributions received from Tium 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, 2020, we recognized \$24.4 million in equity earnings from Tium Group, which was equal to our proportionate share of Tium Group's net income for the year.

As of December 31, 2021, we concluded the carrying amount of our investment in Tium Services was not fully recoverable due to the remaining expected future cash distributions to be received as Tium Services shuts its 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.

See further discussion of year over year changes in Earnings from Equity Investments in "Business Segments" under this Item. Additional information related to equity method investments is included in Note 8 to the Consolidated Financial Statements included in Item 8 of this Report.

Tium Group's audited consolidated financial statements as of December 31, 2021 and 2020 and for the years then ended are included in Item 15 - "Exhibits and Financial Statement Schedules" ("Item 15") of this Report.

Gain on extinguishment of debt

On July 27, 2021, we received formal notification in the form of a letter dated July 19, 2021 from Bank of Oklahoma ("BOK") that the SBA approved our PPP Loan forgiveness application for the PPP Loan in the amount of \$3.3 million (including accrued interest). For the year ended December 31, 2021, we recorded a gain on extinguishment of the PPP Loan in the amount of \$3.3 million in the Consolidated Statement of Operations, which is included as a component of "Other income (expense)."

Tax Credits and Obligations

Historically, we have earned Section 45 tax credits that may be available for future benefit related to the production of RC from the operation of RC facilities in which we have held both direct ownership and indirect ownership through Tinum's direct ownership. We refer to these RC facilities as "retained facilities." The Section 45 tax credit period ended December 31, 2021 and we will not earn Section 45 tax credits beyond this date. As of December 31, 2021, we had approximately \$86.1 million in Section 45 tax carryforwards.

In the hypothetical event of an ownership change, as defined by IRC Section 382, utilization of general business credits ("GBC's") generated prior to the change would be subject to an annual limitation imposed by IRC Section 383 for GBC's. The results of a recent analysis indicated that we had not experienced an ownership change as of December 31, 2021, as defined by IRC Section 382. Such analysis for the period from January 1, 2022 through the date of this Report has not been completed. Therefore, it is possible that we experienced an ownership change between January 1, 2022 and the date of the filing of this Report, thus subjecting our GBC carryforwards to limitation.

Interest expense

Interest expense decreased year over year by \$2.4 million primarily due to principal payments made in 2021 on a senior term loan (the "Senior Term Loan") that resulted in lower coupon interest expense of \$1.5 million. Interest expense for debt discount and debt issuance costs related to the Senior Term Loan also decreased by \$0.5 million pursuant to the decrease in the Senior Term Loan principal. On June 1, 2021 and prior to the Senior Term Loan's maturity date, we paid the remaining principal balance of the Senior Term Loan and all remaining accrued interest through this date.

The remaining decrease in interest expense year over year related to lower interest expense ("Section 453A interest") related to IRS section 453A ("Section 453A"), which decreased by \$0.3 million primarily due to a decrease in Tinum Group's the tax liability year over year associated with RC facilities in which Tinum Group recognized as installment sales for tax purposes.

The following table shows the balance of the tax liability that has been deferred and the applicable interest rate used to calculate the 453A interest liability:

<i>(in thousands)</i>	<u>As of December 31,</u> <u>2020</u>
Tax liability deferred on installment sales ⁽¹⁾	\$ 10,653
Interest rate	3.00 %

(1) Represents the approximate tax effected liability utilizing the federal tax rate in effect for the applicable year ended related to the deferred gain on installment sales, which was approximately zero as of December 31, 2021.

Income tax expense

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

For the year ended December 31, 2020, our reported income tax expense of \$6.5 million and was based on an inverse effective rate of 47%, which differed from the Federal Rate of 21% due to primarily an increase in the valuation allowance on our deferred tax assets. This increase in the valuation allowance resulted in income tax expense rather than expected income tax benefit based on the pretax loss.

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, 2021, 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, 2021. In reaching this conclusion, we primarily considered forecasts of future taxable losses. As of December 31, 2021 and 2020, we had a valuation allowance of \$87.5 million and \$88.8 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 18 of the Consolidated Financial Statements included in Item 8 of this Report.

Non-GAAP Financial Measures

To supplement our financial information presented in accordance with GAAP, we are providing non-GAAP measures of certain financial performance. These non-GAAP measures include Consolidated EBITDA, Consolidated Adjusted EBITDA, RC Segment EBITDA, RC Segment Adjusted EBITDA, APT Segment EBITDA and APT Segment Adjusted EBITDA. We have included non-GAAP measures because management believes that they help to facilitate period to period comparisons of our operating results. 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 that 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 Consolidated EBITDA as net income 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 Consolidated Adjusted EBITDA as Consolidated EBITDA, reduced by the non-cash impacts of equity earnings from equity method investments, gain on change in estimate of asset retirement obligations, gain on extinguishment of debt and gain on customer settlement, and increased by cash distributions from equity method investments and impairment of long-lived assets. Because Consolidated Adjusted EBITDA omits certain non-cash items, we believe that the measure is less susceptible to variances that affect our operating performance.

We define APT Segment EBITDA (loss) as APT Segment operating 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 and interest expense, net. We define APT Segment Adjusted EBITDA (loss) as APT Segment EBITDA (loss), reduced by gain on customer settlement, gain on change in estimate of asset retirement obligation, gain on extinguishment of debt and gain on customer settlement, and increased by impairment of long-lived assets.

We define RC Segment EBITDA as RC Segment operating income 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 and interest expense. We define RC Segment Adjusted EBITDA as RC Segment EBITDA, reduced by the non-cash impact of equity earnings from equity method investments and gain on extinguishment of debt, and increased by cash distributions from equity method investments.

When used in conjunction with GAAP financial measures, we believe these non-GAAP measures are supplemental measures of operating performance that 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.

With the exception of extinguishment of debt, gain on change in estimate, asset retirement obligation, impairment on long-lived assets and gain on settlement, the adjustments to Consolidated Adjusted EBITDA and APT Segment Adjusted EBITDA in future periods are generally expected to be 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 income (loss) to Consolidated EBITDA (Loss) and Consolidated Adjusted EBITDA

The following table reconciles net income (loss), our most directly comparable as-reported financial measure calculated in accordance with GAAP, to Consolidated EBITDA (Loss) and Consolidated Adjusted EBITDA. A reconciliation of RC Segment EBITDA, RC Segment Adjusted EBITDA, APT Segment EBITDA and APT Segment Adjusted EBITDA to our most directly comparable as-reported financial measure calculated in accordance with GAAP is included below following the discussion of the results of each respective segment.

	Year ended December 31,	
	2021	2020
Net income (loss)	\$ 60,401	\$ (20,302)
Depreciation, amortization, depletion and accretion	7,933	8,537
Amortization of Upfront Customer Consideration	508	158
Interest expense, net	1,164	3,793
Income tax expense	15,672	6,511
Consolidated EBITDA (loss)	85,678	(1,303)
Cash distributions from equity method investees	74,026	62,441
Equity earnings	(68,726)	(30,978)
Gain on extinguishment of debt	(3,345)	—
Gain on change in estimate, asset retirement obligation	(2,702)	—
Impairment	—	26,103
Gain on settlement	—	(1,129)
Consolidated Adjusted EBITDA	\$ 84,931	\$ 55,134

Business Segments

As of December 31, 2021, we have two reportable segments, RC and APT.

The business segment measurements provided to and evaluated by our chief operating decision maker are computed in accordance with the principles listed below:

- The accounting policies of the operating segments are the same as those described in the summary of significant accounting policies except as described below.
- Segment revenues include equity method earnings and losses from our equity method investments.
- Segment operating income (loss) includes segment revenues, gains related to sales of equity method investments and allocation of certain "Corporate general and administrative expenses," which include Payroll and benefits, Legal and professional fees, General and administrative, and Depreciation, amortization, depletion and accretion.
- RC segment operating income includes interest expense directly attributable to the RC segment.

The principal products and services of our segments are described in Item 1 of this Report. The following table presents our operating segment results for the years ended December 31, 2021 and 2020:

<i>(in thousands)</i>	Years Ended December 31,		Change
	2021	2020	(\$)
Revenues:			
Refined Coal:			
Earnings in equity method investments	\$ 68,726	\$ 30,978	\$ 37,748
License royalties, related party	14,368	13,440	928
	<u>83,094</u>	<u>44,418</u>	<u>38,676</u>
Advanced Purification Technologies:			
Consumables ⁽¹⁾	85,882	53,908	31,974
Other	44	15	29
	<u>85,926</u>	<u>53,923</u>	<u>32,003</u>
Total segment reporting revenues	<u>169,020</u>	<u>98,341</u>	<u>70,679</u>
Adjustments to reconcile to reported revenues:			
Earnings in equity method investments	(68,726)	(30,978)	(37,748)
Total reported revenues	<u>\$ 100,294</u>	<u>\$ 67,363</u>	<u>\$ 32,931</u>
Segment operating income (loss)			
Refined Coal	\$ 82,634	\$ 42,689	\$ 39,945
Advanced Purification Technologies ⁽²⁾	5,649	(39,958)	45,607
Total segment operating income	<u>\$ 88,283</u>	<u>\$ 2,731</u>	<u>\$ 85,552</u>

(1) Included in the APT segment operating income (loss) for the years ended December 31, 2021 and 2020 was \$7.4 million and \$7.9 million, respectively, of depreciation, amortization, depletion and accretion expenses on mine- and plant-related long-lived assets and liabilities. Further included in the APT segment operating income (loss) for the year ended December 31, 2021 was \$2.7 million related to the gain on change in estimate, asset retirement obligation. Included in the APT segment operating loss for the year ended December 31, 2020 was an impairment charge of \$26.1 million offset by gain on settlement with the Former Customer of \$1.1 million.

A reconciliation of segment operating income to consolidated net income is included in Note 19 of the Consolidated Financial Statements included in Item 8 of this Report.

Refined Coal

The following table provides the segment revenues of our respective equity method investments for the years ended December 31, 2021 and 2020:

<i>(in thousands)</i>	Year ended December 31,	
	2021	2020
Earnings from Tinum Group	\$ 61,837	\$ 24,396
Earnings from Tinum Services	6,952	6,582
Loss from other	(63)	—
Earnings from equity method investments	<u>\$ 68,726</u>	<u>\$ 30,978</u>

For 2021, equity earnings from Tinum Group were positively impacted by an increase in overall coal-fired power generation demand and higher production volume from coal-fired sources, which was driven by higher prices related to alternative power generation sources such as natural gas. Also, this increase was driven by higher RC facility count for the majority of 2021 compared to 2020. Further, for the year ended December 31, 2020, we recognized equity earnings from Tinum Group equal to

our proportionate share of Tinuum Group's net income for the period, which was less than cash distributions received for the same period.

In the fourth quarter of 2020, Tinuum Group recorded an impairment charge of \$3.0 million on certain of its assets located at RC facilities and a retention accrual related to the wind down of its operations upon the expected expiration of Section 45 on December 31, 2021.

RC earnings related to M-45 license royalties increased from 2021 to 2020 as a result of an increase in the royalty rate per ton year over year offset by a reduction in RC facilities subject to the M-45 License due to the expected expiration of Section 45 on December 31, 2021.

Equity earnings from Tinuum Services increased by \$0.4 million in 2021 compared to 2020 primarily as a result of recording an impairment charge of \$2.9 million for year ended December 31, 2020 as well as an increase in tonnage for the RC facilities that Tinuum Services operated in 2021 compared to 2020. As of December 31, 2021 and 2020, Tinuum Services provided operating and maintenance services to zero and 22 RC facilities, respectively. Tinuum Services derived earnings from both fixed-fee arrangements as well as fees that are tied to actual RC production, as determined by the specific RC facility operating and maintenance agreement.

As discussed above, as of December 31, 2021, the Company reduced its investment in Tinuum Services 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.

Outlook

As a result of the expiration of the ability to generate Section 45 tax credits after December 31, 2021, both Tinuum Group and Tinuum Services ceased operations and are in reclamation of their respective businesses. The loss of equity earnings, distributions and M-45 Royalties beginning in 2022 will have a material adverse effect on our financial condition and consolidated operating results compared to historical periods.

Reconciliation of RC Segment operating income to RC Segment EBITDA and RC Segment Adjusted EBITDA

The following table reconciles RC Segment operating income, our most directly comparable as-reported financial measure calculated in accordance with GAAP, to RC Segment EBITDA and RC Adjusted EBITDA.

<i>(in thousands)</i>	Year ended December 31,	
	2021	2020
RC Segment operating income	\$ 82,634	\$ 42,689
Depreciation, amortization, depletion and accretion	40	116
Interest expense	12	331
RC Segment EBITDA	82,686	43,136
Cash distributions from equity method investees	74,026	62,441
Equity earnings	(68,726)	(30,978)
Gain on extinguishment of debt	(97)	—
RC Segment Adjusted EBITDA	<u>\$ 87,889</u>	<u>\$ 74,599</u>

Advanced Purification Technologies

APT segment operating income increased during the year ended December 31, 2021 compared to 2020 primarily due to the Impairment Charge of \$26.1 million recorded for the year end December 31, 2020. Further, for the year ended December 31, 2021, consumable revenues and associated gross margin increased, driven by an increase in volume year over year, specifically related to the Supply Agreement, as well as an increase in demand for our products by our current customer base and from new customers.

During the year ended December 31, 2020, we incurred costs of \$0.4 million related to sequestration of certain of our employees at our Red River plant. These costs included hazardous pay, lodging expense and other related costs for 60 days.

Outlook

Based on current market estimates, we believe that the APT segment will continue to be affected, both positively and negatively, by power generation and the pricing of other sources, including natural gas and renewable energy, as well as weather throughout the U.S. In 2022, we expect demand from our current customers to be consistent with 2021 based on current market trends. Further, we see opportunities and are continuing to pursue diverse markets for our purification products outside of coal-fire power generation, including industrial application, water treatment plants and other end markets.

Reconciliation of APT Segment operating income (loss) to APT Segment EBITDA (loss) and APT Segment Adjusted EBITDA (loss)

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

<i>(in thousands)</i>	Year ended December 31,	
	2021	2020
APT Segment operating income (loss)	\$ 5,649	\$ (39,958)
Depreciation, amortization, depletion and accretion	7,388	7,870
Amortization of Upfront Customer Consideration	508	158
Interest expense, net	297	402
APT Segment EBITDA (loss)	13,842	(31,528)
Gain on extinguishment of debt	(2,562)	—
Gain on change in estimate, asset retirement obligation	(2,702)	—
Impairment	—	26,103
Gain on settlement	—	(1,129)
APT Segment Adjusted EBITDA (loss)	\$ 8,578	\$ (6,554)

Liquidity and Capital Resources

Current Resources and Factors Affecting Our Liquidity

As of December 31, 2021, our principal future sources of liquidity include:

- \$88.8 million of cash, cash equivalents and restricted cash; and
- operations of the APT segment

For the year ended December 31, 2021, our principal uses of liquidity included:

- our business operating expenses, including capital expenditures, reclamation costs, federal and state tax payments and cash severance payments; and
- payment of debt principal and interest.

During 2021, our liquidity position was positively affected primarily from cash distributions from Tinuum Group and Tinuum Services, royalty payments from Tinuum Group and borrowing availability under our line of credit with a bank ("Line of Credit"). Due to the expiration of the Section 45 tax period as of December 31, 2021 and the resultant wind down of Tinuum Group's and Tinuum Services' operations at the end of 2021, distributions from Tinuum Group will no longer be a material source of liquidity after 2021. Our line of credit expired on December 31, 2021.

Our ability to continue to generate sufficient cash flow required to meet ongoing operational needs and obligations, and make potential future dividend payments and share repurchases depends upon several factors. These include: (1) executing on our contracts and initiatives; (2) increasing our share of the market for APT consumables, including expanding our overall AC business into additional adjacent markets and improving our customer and product mix; and (3) receiving final, expected M-45 License royalty payments from Tinuum Group and distributions from Tinuum Group and Tinuum Services in 2022.

For 2022 and beyond, our primary sources of liquidity are expected to be from cash on hand and through the ongoing operations of our APT segment. We believe our existing operations and related contract volumes will continue to provide operating cost efficiencies of the Red River Plant, providing additional sources of operating cash flows in the future. Full and partial reimbursements on capital expenditures from Cabot will offset our uses of investing cash flows. As discussed above, on February 25, 2022, we received the Cabot Payment in the amount of \$10.6 million, which provides a source of cash for us in 2022.

Tinuum Group and Tinuum Services Distributions

The following table summarizes the cash distributions from our equity method investments, which most significantly affected our consolidated cash flow results, for the years ended December 31, 2021 and 2020:

<i>(in thousands)</i>	Year ended December 31,	
	2021	2020
Tinuum Group	\$ 65,224	\$ 53,289
Tinuum Services	8,802	9,152
Distributions from equity method investees	\$ 74,026	\$ 62,441

Cash distributions from Tinuum Group for 2021 increased by \$11.9 million compared to 2020 primarily due to higher production volume driven by high competitor prices related to alternative power generation sources such as natural gas. Also, this increase was driven by higher average RC facility count for the year ended December 31, 2021 compared to 2020.

Both Tinuum Group and Tinuum Services ceased their operations as of December 31, 2021 due to the expiration of the Section 45 tax credit period as of December 31, 2021. As such, our distributions from our RC segment will substantially cease as of December 31, 2021.

During the first half of 2022, we expect to receive final cash distributions from Tinuum Group and Tinuum Services in the range of \$4.0 to \$5.0 million.

PPP Loan

On April 20, 2020, we entered into the PPP Loan under the PPP, evidenced by a promissory note, with BOK providing for \$3.3 million in proceeds, which was funded on April 21, 2020. The PPP Loan had a maturity date of April 21, 2022. The PPP Loan

principal was eligible for forgiveness subject to the terms of the PPP and approval by the SBA. The interest rate on the PPP Loan was 1.00%. The PPP Loan was unsecured and contains customary events of default relating to, among other things, payment defaults, making materially false and misleading representations to the SBA or BOK, or breaching the terms of the PPP Loan. The occurrence of an event of default could result in the repayment of all amounts outstanding, collection of all amounts owing from us, or filing suit and obtaining judgment against us.

On July 27, 2021, we received formal notification in the form of a letter dated July 19, 2021 from BOK that the SBA approved the forgiveness of our PPP Loan forgiveness application for the PPP Loan in the amount of \$3.3 million (including accrued interest). For the year ended December 31, 2021, the Company recorded a gain on extinguishment of the PPP Loan in the amount of \$3.3 million in the Consolidated Statements of Operations, which is included as a component of "Other income (expense)."

Restricted Cash

As of December 31, 2021, we had long-term restricted cash of \$10.0 million as required under the Surety Agreement related to the Reclamation Contract.

Senior Term Loan

On December 7, 2018, we and ADA-ES, Inc. ("ADA"), a wholly-owned subsidiary, and certain other subsidiaries of the Company as guarantors, The Bank of New York Mellon as administrative agent, and Apollo Credit Strategies Master Fund Ltd and Apollo A-N Credit Fund (Delaware) L.P., affiliates of a beneficial owner of greater than five percent of our common stock and a related party, entered into the Senior Term Loan in the amount of \$70.0 million, less original issue discount of \$2.1 million. Proceeds from the Senior Term Loan were used to fund the acquisition of Carbon Solutions. We also paid debt issuance costs of \$2.0 million related to the Senior Term Loan. The Senior Term Loan bore interest at a rate equal to 3-month LIBOR (subject to a 1.5% floor) + 4.75% per annum, which was adjusted quarterly to the current 3-month LIBOR rate, and interest was payable quarterly in arrears. The Senior Term Loan was secured by substantially all the assets of the Company, including the cash flows from the Tinum Entities, but excluding our equity interests in the Tinum entities.

On June 1, 2021 and prior to the Senior Term Loan's maturity date, we paid the remaining principal outstanding on the Senior Term Loan and all remaining accrued interest through this date. We did not incur any prepayment fees associated with the early pay-off.

Stock Repurchases and Dividends

In November 2018, our Board authorized us to purchase up to \$20.0 million of our 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. As of November 2019, \$2.9 million remained outstanding related to Stock Repurchase Program. 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 otherwise modified by the Board. We did not make any stock repurchases during the year ended December 31, 2021.

During the year ended December 31, 2021, we did not pay quarterly cash dividends to stockholders. We paid our most recent dividend in March 2020 of \$0.25 per share.

Line of Credit

In September 2013, ADA, as borrower, ADES, as guarantor, entered into the Line of Credit with a bank for an aggregate principal amount of \$10.0 million that was secured by certain amounts due to us from certain Tuum Group RC leases. The Line of Credit was amended 16 times from the period from December 2, 2013 through March 23, 2021, which included a reduction in the principal amount to \$5.0 million in September 2018. The Line of Credit expired on December 31, 2021.

Cash Flows

Cash, cash equivalents and restricted cash increased from \$35.9 million as of December 31, 2020 to \$88.8 million as of December 31, 2021, an increase of \$52.8 million. The following table summarizes our cash flows for the years ended December 31, 2021 and 2020, respectively:

(in thousands)	Years Ended December 31,		Change
	2021	2020	
Cash provided by (used in):			
Operating activities	\$ 25,999	\$ 54,048	\$ (28,049)
Investing activities	44,378	(7,466)	51,844
Financing activities	(17,529)	(27,730)	10,201
Net change in Cash and Cash Equivalents and Restricted Cash	\$ 52,848	\$ 18,852	\$ 33,996

Cash flows from operating activities

Cash flows provided by operating activities for the year ended December 31, 2021 decreased by \$28.0 million compared to the year ended December 31, 2020 and the net decrease was primarily due to the following: (1) a decrease in Distributions from equity method investees, return on investment of \$39.5 million year over year; (2) an increase in Earnings from equity method investments of \$37.7 million year over year; (3) Impairment of long-lived assets of \$26.1 million recorded in 2020; and (4) Gain on extinguishment of debt of \$3.3 million recorded in 2021. Offsetting the net decrease in cash flows provided by operating activities year over year was a net change in net income of \$80.7 million year over year as a result of net loss recognized for the year ended December 31, 2020.

Cash flows from investing activities

Cash flows provided by investing activities for the year ended December 31, 2021 were \$44.4 million compared to cash flows used in investing activities of \$7.5 million for the year ended December 31, 2020. This net increase in cash flows provided by investing activities was primarily due to increases in distributions from equity earnings in excess of cumulative earnings of \$51.1 million year over year as well as proceeds from the sale of property and equipment in 2021.

Cash flows from financing activities

Cash flows used in financing activities for the year ended December 31, 2021 decreased by \$10.2 million compared to the year ended December 31, 2020 primarily due to lower principal payments on the Senior Term Loan of \$8.0 million. Also contributing to the decrease was a decrease year over year in dividends paid and shares repurchased of \$4.9 million and \$0.2 million, respectively, and a reduction in repurchases of shares of our common stock to satisfy tax withholdings of \$0.3 million. Offsetting the net decrease year over year was \$3.3 million of cash proceeds received in 2021 from the forgiveness of the PPP Loan.

Material Cash Requirements

For 2022, we expect to spend \$13.0 million in capital expenditures compared to \$7.6 million incurred in 2021. This increase is primarily the result of forecasted improvements to the plant, which are estimated to be \$7.0 million, product specific capital expenditures related to the Supply Agreement, which are estimated to be \$1.0 million and routine, scheduled maintenance improvements.

As of June 30, 2021, we entered into the Retention Agreements for the purpose of retaining officers and key employees in order to maintain our current business operations, while we pursue and execute on our strategic initiatives. The total amount due at time of payment pursuant to the Retention Agreements is \$2.0 million, which we expect to pay in 2022.

We intend to fund the remaining portion of the Reclamation Costs from cash on hand as well as cash generated from the Supply Agreement. We believe that as reclamation activities proceed and the related bonded amounts required under the Surety Agreement are able to be reduced, there may be an opportunity to further reduce the collateral requirement. On a normalized basis, our annual capital expenditures, exclusive of any capital specifically procured for Cabot under the Supply Agreement or capital for major improvements to the plant, are expected to average approximately \$5.0 million.

We expect that our cash on hand as of December 31, 2021 will provide sufficient liquidity to fund operations for the next 12 months.

Contractual obligations as of December 31, 2021 are as follows:

<i>(in thousands)</i>	Payment Due by Period				
	Total	Less than 1 year	1-3 years	4-5 years	After 5 years
Finance lease obligations	4,486	1,008	2,909	569	—
Operating lease obligations	7,249	2,502	2,744	1,132	871
Reclamation liability, Marshall Mine ⁽¹⁾	7,631	2,104	2,885	1,231	1,411
	<u>\$ 19,366</u>	<u>\$ 5,614</u>	<u>\$ 8,538</u>	<u>\$ 2,932</u>	<u>\$ 2,282</u>

(1) Includes payments due under a capped fee contract with a third-party mining operator for reclamation of the Marshall Mine (the "Marshall Mine ARO"). Payments on this contract are due through approximately 2031. Reclamation costs related to the Marshall Mine ARO are based on a stated fee by month 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 over time. The timing and amount of future payments may change from original estimates, and the Company assesses changes in estimated future amounts on a quarterly basis.

The table above also excludes our asset retirement obligation ("ARO") related to reclamation of the Five Forks Mine (the "Five Forks ARO"). As of December 31, 2021, our consolidated balance sheet reflects a liability of \$3.6 million for the Five Forks ARO. The Five Forks Mine ARO was recorded at fair value. 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 Five Forks Mine expected closure date.

We had no outstanding letters of credit as of December 31, 2021. We expect that our cash on hand as of December 31, 2021 will provide sufficient liquidity to fund operations for the next 12 months.

As of December 31, 2021, we had outstanding surety bonds of \$24.1 million related to performance requirements under reclamation contracts associated with both the Five Forks Mine and the Marshall Mine. As of December 31, 2021, we had restricted cash of \$10.0 million securing the Surety Agreement. 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 be released, and we should not have any continuing obligations. However, in the event any surety bond is called, our indemnity obligations could require us to reimburse the issuer of the surety bond.

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;

- 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 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.

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 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 18 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).

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, Inc.

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Advanced Emissions Solutions, Inc.

Consolidated Financial Statements:

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Report of Independent Registered Public Accounting Firm

To the Shareholders and the Board of Directors of
Advanced Emissions Solutions, Inc.

Opinion on the Financial Statements

We have audited the accompanying consolidated balance sheets of Advanced Emissions Solutions, Inc. and subsidiaries (the "Company") as of December 31, 2021 and 2020, 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). In our opinion, the consolidated financial statements present fairly, in all material respects, the consolidated financial position of the Company as of December 31, 2021 and 2020, 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.

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 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 Matter

The critical audit matter communicated below is a matter arising from the current period audit of the consolidated financial statements that was communicated or required to be communicated to the audit committee and that (1) relates to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. The communication of critical audit 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.

Income Taxes – Realizability of Deferred Tax Assets

As described in Notes 1 and 18 to the consolidated financial statements, the Company recognizes deferred income taxes for the effects of temporary differences between the tax basis of an asset or liability and their reported amounts in the accompanying consolidated balance sheet. These temporary differences result in taxable or deductible amounts in future years. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount that is more likely than not to be realized. As of December 31, 2021, the Company concluded it is more likely than not that 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, which resulted in a valuation allowance of \$87.5 million.

We identified the realizability of deferred tax assets as a critical audit matter due to the Company's tax structure and the significant judgments and estimates made by management to determine that sufficient taxable income will not be generated to realize a portion of deferred tax assets prior to expiration. This required a high degree of auditor judgment and an increased extent of effort when performing audit procedures to evaluate management's estimates of taxable income prior to expiration.

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

- Recalculating the mathematical accuracy of management's accounting for the previously described taxes, which included supporting calculations, schedules, and reconciliations.
- Reading and evaluating management's documentation of the accounting for income taxes, including their analysis of the valuation allowance. This includes relevant significant accounting policies, and information obtained by management from third party tax specialists which details management's basis for the accounting and impact to the consolidated financial statements, inclusive of relevant positive and negative evidence available and utilized in performing the analysis.
- Obtaining and evaluating the supporting tax analyses and documentation prepared by management as a framework and initial support for audit procedures. This includes gaining an understanding of the Company's estimation process, the Company's deferred tax calculations, which also integrates management's analysis of valuation allowances, current tax expenses (benefits), and IRC Section 45 credits.
- Consulting with internal tax specialists in evaluating management's calculation of its provision for income taxes and that the significant judgments used were applied consistently with the tax code.
- Evaluating whether significant estimates and judgments used were consistent with past performance related to said estimates, the consistency of future forecasts and projections based on current operating and market conditions and future expectations, and that all were consistent with evidence obtained in procedures performed in other areas of the audit.
- Evaluating the adequacy of the Company's disclosure in Notes 1 and 18 in relation to the income taxes.

/s/ Moss Adams LLP

Denver, Colorado
March 8, 2022

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

Advanced Emissions Solutions, Inc. and Subsidiaries
Consolidated Balance Sheets

<i>(in thousands, except share data)</i>	As of December 31,	
	2021	2020
ASSETS		
Current assets:		
Cash, cash equivalents and restricted cash	\$ 78,753	\$ 30,932
Receivables, net	12,622	13,125
Receivables, related party	2,481	3,453
Inventories, net	7,850	9,882
Prepaid expenses and other current assets	6,661	4,597
Total current assets	<u>108,367</u>	<u>61,989</u>
Restricted cash, long-term	10,027	5,000
Property, plant and equipment, net of accumulated depreciation of \$7,684 and \$3,340, respectively	30,171	29,433
Intangible assets, net	1,237	1,964
Equity method investments	2,391	7,692
Deferred tax assets, net	—	10,604
Other long-term assets, net	33,243	29,989
Total Assets	<u>\$ 185,436</u>	<u>\$ 146,671</u>
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	\$ 10,009	\$ 7,849
Accrued payroll and related liabilities	6,477	3,257
Current portion of long-term debt	1,011	18,441
Other current liabilities	5,124	12,996
Total current liabilities	<u>22,621</u>	<u>42,543</u>
Long-term debt, net of current portion	3,152	5,445
Other long-term liabilities	12,362	13,473
Total Liabilities	<u>38,135</u>	<u>61,461</u>
Commitments and contingencies (Note 14)		
Stockholders' equity:		
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, 23,460,212 and 23,141,284 shares issued and 18,842,066 and 18,523,138 shares outstanding at December 31, 2021 and 2020, respectively	23	23
Treasury stock, at cost: 4,618,146 and 4,618,146 shares as of December 31, 2021 and 2020, respectively	(47,692)	(47,692)
Additional paid-in capital	102,106	100,425
Retained earnings	92,864	32,454
Total stockholders' equity	<u>147,301</u>	<u>85,210</u>
Total Liabilities and Stockholders' equity	<u>\$ 185,436</u>	<u>\$ 146,671</u>

See Notes to the Consolidated Financial Statements.

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

<i>(in thousands, except per share data)</i>	Years Ended December 31,	
	2021	2020
Revenues:		
Consumables	\$ 85,882	\$ 53,908
License royalties, related party	14,368	13,440
Other	44	15
Total revenues	100,294	67,363
Operating expenses:		
Consumables cost of revenues, exclusive of depreciation and amortization	65,576	50,962
Other cost of revenues, exclusive of depreciation and amortization	—	(563)
Payroll and benefits	11,315	10,621
Legal and professional fees	6,260	5,585
General and administrative	7,060	8,228
Depreciation, amortization, depletion and accretion	7,933	8,537
Gain on change in estimate, asset retirement obligation	(2,702)	—
Impairment of long-lived assets	—	26,103
Gain on settlement	—	(1,129)
Total operating expenses	95,442	108,344
Operating income (loss)	4,852	(40,981)
Other income (expense):		
Earnings from equity method investments	68,726	30,978
Gain on extinguishment of debt	3,345	—
Interest expense	(1,490)	(3,920)
Other	640	132
Total other income	71,221	27,190
Income (loss) before income tax expense	76,073	(13,791)
Income tax expense	15,672	6,511
Net income (loss)	\$ 60,401	\$ (20,302)
Earnings (loss) per common share (Note 1):		
Basic	\$ 3.31	\$ (1.12)
Diluted	\$ 3.27	\$ (1.12)
Weighted-average number of common shares outstanding:		
Basic	18,258	18,044
Diluted	18,461	18,044

See Notes to the Consolidated Financial Statements.

Advanced Emissions Solutions, Inc. and Subsidiaries
Consolidated Statements of Changes in Stockholders' Equity

<i>(in thousands, except share data)</i>	Common Stock		Treasury Stock		Additional Paid- in Capital	Retained Earnings/(Accumulated Deficit)	Total Stockholders' Equity
	Shares	Amount	Shares	Amount			
Balances, January 1, 2020	22,960,157	\$ 23	(4,597,533)	\$ (47,533)	\$ 98,466	\$ 57,336	\$ 108,292
Stock-based compensation	278,910	—	—	—	2,496	—	2,496
Repurchase of common shares to satisfy tax withholdings	(97,783)	—	—	—	(537)	—	(537)
Cash dividends declared on common stock	—	—	—	—	—	(4,580)	(4,580)
Repurchase of common shares	—	—	(20,613)	(159)	—	—	(159)
Net loss	—	—	—	—	—	(20,302)	(20,302)
Balances, December 31, 2020	23,141,284	\$ 23	(4,618,146)	\$ (47,692)	\$ 100,425	\$ 32,454	\$ 85,210
Stock-based compensation	364,657	—	—	—	1,927	—	1,927
Repurchase of common shares to satisfy tax withholdings	(45,729)	—	—	—	(246)	—	(246)
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

See Notes to the Consolidated Financial Statements.

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

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Cash flows from operating activities		
Net income (loss)	\$ 60,401	\$ (20,302)
Adjustments to reconcile net income (loss) to net cash provided by operating activities:		
Deferred income tax expense	10,604	3,491
Depreciation, amortization, depletion and accretion	7,933	8,537
Amortization of debt discount and debt issuance costs	945	1,418
Operating lease expense	2,038	3,559
Gain on extinguishment of debt	(3,345)	—
Gain on change in estimate, asset retirement obligation	(2,702)	—
Impairment of long-lived assets	—	26,103
Gain on settlement	—	(1,129)
Recovery of accounts receivable and other receivables	(36)	(990)
Stock-based compensation expense	1,927	2,496
Earnings from equity method investments	(68,726)	(30,978)
Other non-cash items, net	(173)	192
Changes in operating assets and liabilities, net of effects of acquired businesses:		
Receivables, net	540	(2,541)
Related party receivables	972	794
Prepaid expenses and other current assets	(2,064)	3,234
Inventories, net	1,394	4,748
Other long-term assets, net	1,838	(1,005)
Accounts payable	1,977	(196)
Accrued payroll and related liabilities	3,220	233
Other current liabilities	(8,279)	(520)
Operating lease liabilities	(2,764)	(2,200)
Other long-term liabilities	(2,645)	(3,337)
Distributions from equity method investees, return on investment	22,944	62,441
Net cash provided by operating activities	25,999	54,048

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Cash flows from investing activities		
Distributions from equity method investees in excess of cumulative earnings	\$ 51,082	\$ —
Acquisition of property, equipment and intangible assets, net	(6,201)	(6,685)
Mine development costs	(1,398)	(781)
Proceeds from sale of property and equipment	895	—
Net cash provided by (used in) investing activities	<u>44,378</u>	<u>(7,466)</u>
Cash flows from financing activities		
Principal payments on term loan	(16,000)	(24,000)
Principal payments on finance lease obligations	(1,190)	(1,360)
Dividends paid	(93)	(4,979)
Borrowings from Paycheck Protection Program Loan	—	3,305
Repurchase of shares to satisfy tax withholdings	(246)	(537)
Repurchase of common shares	—	(159)
Net cash used in financing activities	<u>(17,529)</u>	<u>(27,730)</u>
Increase in Cash, Cash Equivalents and Restricted Cash	52,848	18,852
Cash, Cash Equivalents and Restricted Cash, beginning of year	35,932	17,080
Cash, Cash Equivalents and Restricted Cash, end of year	<u>\$ 88,780</u>	<u>\$ 35,932</u>
Supplemental disclosure of cash flow information:		
Cash paid for interest	\$ 524	\$ 2,489
Cash paid (received) for income taxes	\$ 8,882	\$ (84)
Supplemental disclosure of non-cash investing and financing activities:		
Change in accrued purchases for property and equipment	\$ 183	\$ —
Change in asset retirement obligation	\$ 121	\$ 421
Acquisition of property and equipment under finance lease	\$ —	\$ 158
Dividends payable	\$ —	\$ 32

See Notes to the Consolidated Financial Statements.

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

Note 1 - Summary of Operations and Significant Accounting Policies

Nature of Operations

Advanced Emissions Solutions, Inc. ("ADES" or the "Company") is a Delaware corporation with its principal office located in Greenwood Village, Colorado and operations located in Louisiana. The Company is principally engaged in the sale of consumable air and water treatment options including activated carbon ("AC") and chemical technologies. The Company's proprietary technologies in the advanced purification technologies ("APT") market enable customers to reduce air and water contaminants, including mercury and other pollutants, to maximize utilization levels and to improve operating efficiencies to meet the challenges of existing and pending emission control regulations. Through its wholly-owned subsidiary, ADA Carbon Solutions, LLC ("Carbon Solutions"), the Company manufactures and sells AC used to capture and remove contaminants for coal-fired power plants, industrial and water treatment markets. Carbon Solutions also owns an associated lignite mine ("Five Forks Mine") that supplies the primary raw material for manufacturing AC.

Through its equity ownership in Tinum Group, LLC ("Tinuum Group") and Tinuum Services, LLC ("Tinuum Services"), both of which are unconsolidated entities, the Company generates substantial earnings. Tinuum Group provides reduction of mercury and nitrogen oxide ("NOx") emissions at select coal-fired power generators through the production and sale of refined coal ("RC") that qualifies for tax credits ("Section 45 tax credits") under the Internal Revenue Code ("IRC") Section 45 - Production Tax Credit (the "Section 45 tax credit program"). The Company also earns royalties for technologies that are licensed to Tinuum Group and used at certain RC facilities to enhance combustion and reduced emissions of NOx and mercury from coal burned to generate electrical power. Tinuum Services operates and maintains the RC facilities under operating and maintenance agreements with Tinuum Group and owners or lessees of the RC facilities.

Effective December 31, 2021, the Section 45 tax credit program expired and, as a result, both Tinuum Group and Tinuum Services ceased operations and are winding down their respective businesses. Beginning in 2022, our equity earnings generated from both Tinuum Group and Tinuum Services are expected to be minimal. In addition, license royalties earned from Tinuum Group ceased as of December 31, 2021.

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 greater than 20% ownership are accounted for using the equity method based on the legal form of the Company's ownership percentage and are included in the Equity method investments line item in the Consolidated Balance Sheets. As of December 31, 2021, the Company holds equity interests of 42.5% and 50.0% in Tinuum Group and Tinuum Services, LLC ("Tinuum Services"), respectively.

Cash, cash equivalents and restricted cash

Cash and cash equivalents include bank deposits and other highly liquid investments purchased with an original maturity of three months or less.

Restricted cash primarily consists of a surety bond indemnification agreement (the "Surety Agreement") associated with reclamation of a mine. As of December 31, 2020, restricted cash also consisted of minimum cash balance requirements under a line of credit agreement (the "Line of Credit") with a bank (the "Lender"). Restricted cash is classified consistent with the underlying obligation.

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 balances. 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.

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Inventories, net

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 product offerings. 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 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 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 included in Note 9.

Intangible Assets

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

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:

<i>(in thousands, except years)</i>	Weighted Average Useful Life (in years)	As of December 31,			
		2021		2020	
		Cost	Net of Accumulated Amortization	Cost ⁽¹⁾	Net of Accumulated Amortization
Customer relationships	5	\$ 835	\$ 470	\$ 835	\$ 713
Patents	15	1,454	426	1,306	733
Developed technology	5	607	341	607	518
Total		\$ 2,896	\$ 1,237	\$ 2,748	\$ 1,964

(1) As of December 31, 2020, cost was inclusive of the write down of intangibles to fair value based on the impairment charge taken during the year ended December 31, 2020 and further described in Note 6.

Included in the Consolidated Statements of Operations is amortization expense related to intangible assets of \$0.9 million and \$1.0 million for the years ended December 31, 2021 and 2020, respectively. The estimated future amortization expense for existing intangible assets as of December 31, 2021 is expected to be \$0.2 million for each of the five succeeding fiscal years.

Investments

The investments in entities in which the Company does not have a controlling interest (financial or operating), but where it has the ability to exercise significant influence over operating and financial policies, are accounted for using the equity method of accounting. Whether or not the Company exercises significant influence with respect to an investee depends on an evaluation of several factors including, among others, representation on the investee company's board of directors and the Company's ownership level. Under the equity method of accounting, an investee company's financial statements are not consolidated in the Company's Consolidated Balance Sheets and Consolidated Statements of Operations; however, the Company's share of the earnings or losses of the investee company is reported in the "Earnings from equity method investments" line item in the Consolidated Statements of Operations, and the Company's carrying value in an equity method investee company is reported in the "Equity method investments" line in the Consolidated Balance Sheets.

When the Company receives distributions in excess of the carrying value of the investment and has not guaranteed any obligations of the investee and/or is not required to provide additional funding to the investee, the Company recognizes such excess distributions as equity method earnings in the period the distributions occur. When the investee subsequently reports income, the Company does not record its share of such income until it equals the amount of distributions in excess of carrying value that were previously recognized in income. During the years ended December 31, 2021 and 2020, the Company had no guarantees or requirements to provide additional funding to investees.

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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 and/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. As a result, equity income or 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 company's statements of operations. Likewise, 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" in Investing cash flows. See Note 8 for additional information regarding the Company's equity method investments.

Investments in partially-owned subsidiaries for which the Company has 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 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 2 to 31 years). Maintenance and repairs that do not extend the useful life of the respective asset are charged to 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 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. Impairment charges are recorded to "Operating expenses" in the Consolidated Statements of Operations. Amortization of finance leased assets 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.

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 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 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

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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 item, 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, 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, 2021 is estimated to be 13 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 in the period in which they are consumed. 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 components are Consumables sales and License royalties.

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, 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 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 our 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.

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 these activities as fulfillment activities and not as separate performance obligations. Shipping and handling costs incurred by the Company in delivering products to

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customers are billed to customers and are included in the transaction price and included in the "Revenues - 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 of revenues, excluding depreciation and amortization" line item in the Consolidated Statements of Operations.

License royalties, related party

The Company generates 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 Tinnium Group. The Company recognizes M-45 Royalties at a point in time based on the use of the M-45 Technology at certain RC facilities or through Tinnium Group's use of licensed technology for rates in excess of amounts allowed for RC application. The amount of M-45 Royalties recognized is generally based on a percentage of pre-tax margins (as defined in the M-45 License) of the RC facilities using the M-45 Technology.

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 because 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.

Cost of Revenues

Cost of revenues 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.

Payroll and Benefits

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.

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 and other general costs of conducting business.

Research and development costs are charged to expense in the period incurred and are reported in the "General and administrative" line item in the Consolidated Statements of Operations. For the years ended December 31, 2021 and 2020, the Company recorded research and development costs of \$0.4 million and \$1.0 million, respectively.

Asset Retirement Obligations

Asset retirement obligations ("ARO") are comprised of mine reclamation activities required under operating agreements related to the Five Forks Mine and the Marshall Mine (as defined in Note 4) and are recognized when incurred and recorded as liabilities at fair value. An ARO is accreted over time through periodic charges to earnings. Accounting for reclamation and remediation obligations requires the Company to make estimates of 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.

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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 4)

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 Marshall Mine operator. The timing of payments and actual reclamation costs may change and the Company accounts for these changes on a quarterly basis.

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.

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.

Based on its ownership in Tinnuum Group, the Company records its pro-rata share for interest expense resulting from the sale of, or lease income generated from, RC facilities that are treated as installment sales for federal income purposes, pursuant to IRS section 453A ("Section 453A"). Section 453A requires taxpayers using the installment method to pay an interest charge ("453A interest") on the portion of the tax liability that is deferred under the installment method. The Company recognizes 453A interest and other interest and penalties related to unrecognized tax benefits in the "Interest expense" line item in the Consolidated Statements of Operations.

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, 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.

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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.

Potentially dilutive securities consist of restricted stock awards ("RSA's"), as well as outstanding options to purchase common stock ("Stock Options") and contingent performance stock units ("PSU's") (collectively, "Potential dilutive shares"). The dilutive effect, if any, for non-participating RSA's, Stock Options and PSU's is determined using the greater of dilution as calculated under the treasury stock method or the two-class method. 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 PSU's 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 PSU's 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 such PSU's. See Note 16 for additional information related to PSU's.

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

<i>(in thousands, except per share amounts)</i>	Years Ended December 31,	
	2021	2020
Net income (loss)	\$ 60,401	\$ (20,302)
Basic weighted-average number of common shares outstanding	18,258	18,044
Add: dilutive effect of equity instruments	203	—
Diluted weighted-average shares outstanding	18,461	18,044
Earnings (loss) per share - basic	\$ 3.31	\$ (1.12)
Earnings (loss) per share - diluted	\$ 3.27	\$ (1.12)

For the years ended December 31, 2021 and 2020, zero and 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.

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.

Due to the coronavirus ("COVID-19") pandemic, there has been uncertainty and disruption in the global economy and financial markets. Additionally, due to COVID-19, overall power generation and coal-fired power demand may change, which could also

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have a material adverse effect on the Company. The Company is not aware of any specific event or circumstance due to COVID-19 that would require an update to its estimates or judgments or a revision of the carrying values of its assets or liabilities through the date of this Report. These estimates may change as new events occur and additional information is obtained. Actual results could differ materially from these estimates under different assumptions or conditions

Risks and Uncertainties

As of December 31, 2021, all RC facilities had ceased operations and Tinum is expected to complete reclamation activities, as required, during 2022. The loss of earnings from both Tinum Group and Tinum Services will have a significant adverse impact on our financial position, results of operations and cash flows beginning in 2022 and beyond.

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.

New Accounting Guidance

In June 2016, the FASB issued 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 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 interim periods within those years. The Company intends to adopt ASU 2016-13 effective January 1, 2023 and is currently evaluating the provisions of this standard and assessing its impact on the Company's financial statements and disclosures. The Company does not believe this standard will have a material impact on the Company's financial statements and disclosures.

Note 2 - Restatement

Subsequent to the filing of its Quarterly Report for the quarterly period ended September 30, 2021, the Company reassessed its presentation of shipping and handling costs billed to its customers in its Consolidated Statement of Operations for the year ended December 31, 2021. Historically, the Company has accounted for shipping and handling costs billed to customers as a reduction of consumables cost of revenues, as presented in the Consumables cost of revenues, exclusive of depreciation and amortization line item in the Consolidated Statements of Operations. Under *Accounting Standards Codification 606 - Revenue from Contracts with Customers*, shipping and handling costs billed to customers are considered a component of the total transaction price in a contract with a customer and should be presented as revenues.

The Company concluded that its historical presentation of shipping and handling costs billed to customers as a component of cost of revenues rather than as a component of revenues was incorrect and that the Company's presentation of both the "Revenues - Consumables" and "Consumables cost of revenues, exclusive of depreciation and amortization" line items for the year ended December 31, 2020 should be restated. The impact of this error resulted in an understatement of both the "Revenues - Consumables" and "Consumables cost of revenues, exclusive of depreciation and amortization" line items in the Consolidated Statements of Operations for the year ended December 31, 2020, but had no impact to operating income (loss), income (loss) before income taxes, net income (loss) or earnings (loss) per share for these years. Further, there was no impact of this error to the Consolidated Balance Sheets, Consolidated Statements of Stockholders' Equity or Consolidated Statements of Cash Flow as of and for the year ended December 31, 2020.

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A summary of the impact of this restatement for the year ended December 31, 2020 is included in the table below. A summary of the impact of this restatement for the quarterly periods ended March 31, 2021 and 2020; June 30, 2021 and 2020; September 30, 2021 and 2020 and December 31, 2020 are contained in Note 24.

<i>(in thousands, except per share data)</i>	Year ended December 31, 2020		
	As previously reported	Increase/(Decrease)	As Restated
Revenues:			
Consumables	\$ 48,122	\$ 5,786	\$ 53,908
Total revenues	61,577	5,786	67,363
Consumables cost of revenues, exclusive of depreciation and amortization	\$ 45,176	\$ 5,786	50,962
Total operating expenses	102,558	5,786	108,344
Operating loss	\$ (40,981)	\$ —	\$ (40,981)

Note 3 - Customer Supply Agreement

On September 30, 2020, the Company and Cabot Norit Americas, Inc., ("Cabot") entered into a supply agreement (the "Supply Agreement") pursuant to which the Company agreed to sell and deliver to Cabot, and Cabot 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.

In addition to the sale by the Company and purchase by Cabot of Furnace Products, the Company and Cabot have agreed to additional terms whereby Cabot 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 Cabot (referred to as "Shared Capital") and revenues earned from capital expenditures incurred that will benefit Cabot exclusively (referred to as "Specific Capital"). In the event that Cabot ceases to make purchases under the Supply Agreement, Cabot is obligated to pay the balance of any outstanding payments for Specific Capital.

Note 4 - Acquisition of Marshall Mine

Concurrently with the execution of the Supply Agreement, on September 30, 2020, the Company entered into an agreement to purchase (the "Mine Purchase Agreement") from Cabot 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"). The Company independently determined to immediately commence activities to shutter the Marshall Mine and to incur the associated reclamation costs.

In conjunction with the execution of the Supply Agreement and the Mine Purchase Agreement, on September 30, 2020, the Company entered into a reclamation contract (the "Reclamation Contract") with a third party that provides a capped cost, subject to certain contingencies, in the initial amount of approximately \$19.7 million plus an obligation to pay certain direct costs of approximately \$3.6 million (collectively, the "Reclamation Costs") over the estimated reclamation period of 10 years (the "Reclamation Period"). Under the terms of the Supply Agreement, Cabot is obligated to reimburse the Company for \$10.2 million of the Reclamation Costs (the "Reclamation Reimbursement"), payments of which are due semi-annually over the estimated reclamation period and are inclusive of interest. In the event that Cabot has a change in control as described in the Supply Agreement, all outstanding balances of the Reclamation Reimbursement shall be due and payable in full. See further discussion of the Reclamation Costs and Reclamation Reimbursement in Note 5.

As the owner of the Marshall Mine, the Company is required to post a surety bond to ensure performance of its reclamation activities and entered into the Surety Agreement on September 30, 2020. As of December 31, 2021, the Company had a \$16.6 million surety bond (the "Surety Bond") posted with the local regulatory agency. The Surety Bond will remain in place until the Marshall Mine is fully shuttered, and it may be reduced in amount from time to time as the Company progresses with its reclamation activities. As of December 31, 2021 and 2020, for the obligations due under the Reclamation Contract, the

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Company posted cash collateral of \$10.0 million and \$5.0 million, respectively, which is reported as "Restricted Cash, long-term" in the Consolidated Balance Sheets.

The Marshall Mine Acquisition included the acquisition of certain assets that will be consumed and the assumption of certain liabilities that will be paid in reclamation of the Marshall Mine, in addition to the incurrence of an obligation for the Reclamation Costs. The Company determined that the Marshall Mine Acquisition should be accounted for as an asset acquisition as it did not meet the definition of a business. The Company's conclusion was based on the Marshall Mine not having any economic reserves, as the Company commenced full reclamation as of September 30, 2020, and therefore lacked inputs.

As the Marshall Mine Acquisition represented a transaction with a customer of net assets acquired and liabilities assumed from Cabot, the Company accounted for the excess of the fair value of liabilities assumed over assets acquired as upfront consideration transferred to a customer, Cabot (the "Upfront Customer Consideration"). The amount of the Upfront Customer Consideration was recognized net of an additional asset recognized in the Marshall Mine Acquisition, which was comprised of a receivable from Cabot (the "Cabot Receivable") for the Reclamation Reimbursements. The Cabot Receivable is further discussed in Note 5.

The total Upfront Customer Consideration is amortized on a straight-line basis as a reduction to revenue over the expected 15-year contractual period of the Supply Agreement.

The Company paid a nominal cash amount to Cabot in the form of cash for the Marshall Mine and also assumed liabilities whose fair value exceeded the fair value of assets acquired. The net assets acquired and liabilities assumed and the additional assets recorded for the Marshall Mine Acquisition as of September 30, 2020 are shown in the table below. Subsequent to this date, the Company completed additional analysis and adjustments were made as noted in the table below:

<i>(in thousands)</i>	As Originally Reported	Adjustments	As Adjusted
Assets acquired:			
Receivables	\$ —	\$ 513	\$ 513
Property, plant and equipment	3,863	—	3,863
Spare parts	100	—	100
Liabilities assumed:			
Accounts payable and accrued expenses	(673)	160	(513)
Asset retirement obligation	(21,328)	—	(21,328)
Net assets acquired and liabilities assumed from Marshall Mine acquisition	<u>(18,038)</u>	<u>673</u>	<u>(17,365)</u>
Cabot receivable	9,749	—	9,749
Upfront Customer Consideration	<u>\$ 8,289</u>	<u>\$ (673)</u>	<u>\$ 7,616</u>

The Company also evaluated the Marshall Mine entity as a VIE, and determined that because of its structure and closing-stage status, it does not have sufficient equity at-risk and would not likely be able to obtain additional subordinated financial support to complete its closing stage obligations. The Company purchased all of the membership interests in Marshall Mine, LLC and determined that it met the definition of a VIE and that the Company is the primary beneficiary. Therefore, Marshall Mine, LLC's assets and liabilities are consolidated.

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The following tables summarize the assets and liabilities of Marshall Mine and their classification in the Company's Consolidated Balance Sheets:

<i>(in thousands)</i>	As of December 31,		Balance sheet component
	2021	2020	
Cash	\$ 914	\$ 495	Current assets
Cabot receivable, short-term	2,056	921	Current assets
Property and equipment, net	1,968	3,254	Non-current assets
Cabot receivable, long-term	6,846	8,852	Non-current assets
Restricted cash	10,027	5,000	Non-current assets
Upfront customer consideration	6,982	7,490	Non-current assets
Other	—	50	Non-current assets
	\$ 28,793	\$ 26,062	
Accounts payable and accrued liabilities	\$ 1,065	\$ 407	Current liabilities
Asset retirement obligation, short-term	1,775	9,370	Current liabilities
Asset retirement obligation, long-term	4,546	8,760	Non-current liabilities
	\$ 7,386	\$ 18,537	

Note 5 - Marshall Mine Asset Retirement Obligation and related Cabot Receivable

Asset Retirement Obligation

In connection with the Supply Agreement, Mine Purchase Agreement and the Reclamation Contract, the Company assumed the obligation to reclaim and restore the land associated with the Marshall Mine. The Company determined that the Marshall Mine did not have any remaining economic reserves. As of September 30, 2020, the Company recorded an ARO (the "Marshall Mine ARO") as its best estimate for the total Reclamation Costs of \$21.3 million as measured at the estimated future cash flows of \$23.7 million, inclusive of contingency costs, discounted to their present value using a discount rate based on a credit-adjusted, risk-free rate of 7.0%.

As of June 30, 2021 and December 31, 2021, the Company 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 recorded a corresponding gain on change in estimate of \$2.7 million for the year ended December 31, 2021. 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.

Cabot Receivable

As previously disclosed, under the terms of the related Supply Agreement, Cabot is obligated to pay the Reclamation Reimbursement to the Company for \$10.2 million of the Reclamation Costs, inclusive of interest. As of September 30, 2020, the Company recorded the Cabot Receivable for the Reclamation Reimbursement at its estimated fair value, which was measured using a discounted cash flows valuation model that considered the estimated credit risk associated with the obligor's (Cabot's) future performance. Interest is accreted on a monthly basis and recognized as interest income. There were no significant related fees or costs associated with the Cabot Receivable.

As of September 30, 2020, the Company recorded the Cabot Receivable at its estimated fair value of \$9.7 million, reflecting a discount rate of approximately 1.5% or \$0.5 million. Allowances for this asset are assessed periodically, and no allowance was deemed necessary as of December 31, 2021 or 2020.

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Note 6 - Impairment

As part of its periodic review of the carrying value of long-lived assets, the Company assessed its long-lived assets for potential impairment. In assessing impairment of its APT segment's long-lived asset groups as of June 30, 2021, the Company considered factors such as the significant decline in both the APT segment's trailing twelve months revenues and current and future years' forecasted revenues. These factors were largely due to the significant drop in coal-fired power dispatch amid historically low prices of alternative power generation sources, such as natural gas, leading to an increase in natural gas usage as well as other competing energy sources.

As of June 30, 2020, the Company completed an undiscounted cash flow analysis of its APT segment's long-lived assets (the "Asset Group"), which were comprised of its manufacturing plant and related assets and its lignite mine assets. The estimated undiscounted cash flows from the Asset Group was \$54.7 million, which was less than the carrying value of the Asset Group of \$58.3 million. Accordingly, the Company completed an assessment of the Asset Group's fair value and estimated the fair value of the Asset Group at \$32.2 million. This resulted in an impairment and write-down of the Asset Group (the "Impairment Charge") of \$26.1 million as of June 30, 2020. The Impairment Charge is reflected as "Impairment of long-lived assets" in the Consolidated Statement of Operations for the year ended December 31, 2020, and was allocated to the APT segment.

The following table summarizes the allocation to the Asset Group of the Impairment Charge of \$26.1 million recorded as of June 30, 2020:

(in thousands)

Property, plant and equipment, net	\$	18,986
Intangible assets, net		1,445
Other long-term assets, net		5,672
Total impairment	\$	<u>26,103</u>

The Company engaged an independent third party to perform the valuation of the Asset Group in order to determine the estimated fair value of the Asset Group. This valuation was based on the use of several established valuation models including an expected future discounted cash flow model using Level 3 inputs.

Note 7 - COVID-19

In March 2020, the federal government passed the Coronavirus Aid, Relief, and Security Act (the "CARES Act"), which provided among other things the creation of the Paycheck Protection Plan ("PPP"), which was sponsored and administered by the U.S. Small Business Administration ("SBA"). On April 20, 2020, the Company executed a loan agreement (the "PPP Loan") under the PPP, evidenced by a promissory note, with BOK, NA dba Bank of Oklahoma ("BOK"), providing for \$3.3 million in proceeds, which was funded to the Company on April 21, 2020. The PPP Loan was scheduled to mature on April 21, 2022, unless forgiven subject to terms and conditions established by the SBA. The Company initially recorded the PPP Loan as a debt obligation and accrued interest over its term.

On July 27, 2021, the Company received formal notification in the form of a letter dated July 19, 2021 from BOK that the SBA approved the Company's PPP Loan forgiveness application for the PPP Loan in the amount of \$3.3 million (including accrued interest). For the year ended December 31, 2021, the Company recorded a gain on extinguishment of the PPP Loan in the amount of \$3.3 million in the Consolidated Statement of Operations, which is included as a component of "Other income (expense)."

The CARES Act also provided the deferral of payroll tax payments for all payroll taxes incurred through December 31, 2020. The Company elected to defer payments of payroll taxes for the periods allowed under the CARES Act in the amount of \$0.4 million and paid \$0.2 million during the fourth quarter of 2021, with the balance due no later than December 31, 2022.

Note 8 - Equity Method Investments

Tinum Group, LLC

As of December 31, 2021 and 2020, the Company's ownership in Tinum Group was 42.5%. Tinum Group supplies technology, equipment and technical services to cyclone-fired and other boiler users, but its primary purpose is to place into operation facilities that produce and sell RC that lower emissions and therefore qualifies for Section 45 tax credits. NexGen

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Refined Coal, LLC ("NexGen") and GSFS Investments I Corp. ("GSFS"), an affiliate of The Goldman Sachs Group, Inc. ("GS"), own the remaining 42.5% and 15.0%, respectively of Tinum Group. GSFS' ownership interest is in the form of Class B units that do not have voting rights but provide certain preferences over ADA and NexGen as to liquidation and profit distribution.

The Company determined that Tinum Group is a VIE, however, it concluded that it was not the primary beneficiary and therefore did not consolidate Tinum Group, and accounted for it under the equity method of accounting. The Company's conclusion that it was not the primary beneficiary was based on the Company's and NexGen's shared power of Tinum Group.

The following tables summarize the assets, liabilities and results of operations of Tinum Group:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Current assets	\$ 39,387	\$ 142,440
Non-current assets	\$ 220	\$ 28,649
Current liabilities	\$ 15,558	\$ 44,278
Non-current liabilities	\$ —	\$ 5,186
Members equity attributable to Class A members	\$ 8,890	\$ 59,221
Member equity attributable to Class B members	\$ 9,887	\$ 18,769
Noncontrolling interests	\$ 5,272	\$ 43,635

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Gross profit	\$ 6,995	\$ 6,649
Operating, selling, general and administrative expenses	49,414	58,008
Loss from operations	(42,419)	(51,359)
Other income	9,726	17,260
Loss attributable to noncontrolling interest	126,948	91,501
Net income available to Class A and B members	\$ 94,255	\$ 57,402
ADES equity earnings from Tinum Group	\$ 61,837	\$ 24,396

For the year ended December 31, 2021, the Company recognized earnings from Tinum Group's net income available to members that was different from its pro-rata share of Tinum Group's net income available to members, as cash distributions for the year ended December 31, 2021 exceeded the carrying value of the Tinum Group equity investment. For the year ended December 31, 2020, the Company recognized its pro-rata share of Tinum Group's net income available to its members.

The carrying value of the Company's investment in Tinum Group is zero as long as the cumulative amount of distributions received from Tinum Group exceeds the Company's cumulative pro-rata share of Tinum Group's net income available to Class A members. For periods during which the ending balance of the Company's investment in Tinum Group is zero, the Company only recognizes equity earnings from Tinum Group to the extent that cash distributions are received from Tinum Group during the period. For periods during which the ending balance of the Company's investment is greater than zero (e.g., when the cumulative earnings in Tinum Group exceeds cumulative cash distributions received), the Company recognizes its pro-rata share of Tinum Group's net income available to Class A members for the period, less any amount necessary to recover the cumulative earnings short-fall balance as of the end of the immediately preceding period. As shown in the table below, the Company's carrying value in Tinum Group for the years ended December 31, 2021 and 2020 was zero and \$3.4 million, respectively.

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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, 2021 and 2020 (*in thousands*):

Description	Date(s)	Investment balance	ADES equity earnings (loss)	Cash distributions	Memorandum Account: Cash distributions and equity loss in (excess) of investment balance
Beginning balance	12/31/2019	\$ 32,280	\$ —	\$ —	\$ —
ADES proportionate share of net income from Tinum Group	2020 activity	24,396	24,396	—	—
Cash distributions from Tinum Group	2020 activity	(53,289)	—	53,289	—
Total investment balance, equity earnings (loss) and cash distributions	12/31/2020	<u>\$ 3,387</u>	<u>\$ 24,396</u>	<u>\$ 53,289</u>	<u>\$ —</u>
ADES proportionate share of net income from Tinum Group	2021 activity	40,058	40,058	—	—
Cash distributions from Tinum 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 and cash distributions	12/31/2021	<u>\$ —</u>	<u>\$ 61,837</u>	<u>\$ 65,224</u>	<u>\$ (21,779)</u>

Additional information related to Tinum Group is included in Item 15 - "Exhibits and Financial Statement Schedules" ("Item 15") of this Report.

Tinum Services, LLC

In 2010, the Company, together with NexGen, formed Tinum Services for the purpose of operating and maintaining RC facilities, including those RC facilities leased or sold to third parties. The Company determined that Tinum Services is not a VIE and evaluated Tinum Services for potential consolidation under the voting interest model. Because the Company does not own greater than 50% of the outstanding voting shares, it has accounted for its investment in Tinum Services under the equity method of accounting. As of December 31, 2021 and 2020, the Company's investment in Tinum Services was \$2.4 million and \$4.2 million, respectively.

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The following tables summarize the assets, liabilities and results of operations of Tinum Services:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Current assets	\$ 159,013	\$ 301,670
Non-current assets	\$ 19	\$ 45,575
Current liabilities	\$ 14,343	\$ 187,097
Non-current liabilities	\$ —	\$ 6,451
Equity	\$ 6,263	\$ 8,483
Noncontrolling interests	\$ 138,426	\$ 145,214

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Gross loss	\$ (68,465)	\$ (87,723)
Operating, selling, general and administrative expenses	166,075	171,095
Loss from operations	(234,540)	(258,818)
Other income (expenses)	3,830	(1,282)
Loss attributable to noncontrolling interest	246,094	273,262
Net income	\$ 15,384	\$ 13,162

Included in the Consolidated Statement of Operations of Tinum Services for the years ended December 31, 2021 and 2020 were losses related to VIE entities that are consolidated within Tinum Services. These losses do not impact the Company's equity earnings from Tinum Services as 100% of those losses are attributable to a noncontrolling interest and eliminated in the calculations of Tinum Services' net income attributable to the Company's interest.

The following table details the carrying value of the Company's respective equity method investments included in the "Equity method investments" line item on the Consolidated Balance Sheets and indicates the Company's maximum exposure to loss:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Equity method investment in Tinum Group	\$ —	\$ 3,387
Equity method investment in Tinum Services	2,391	4,242
Equity method investment in other	—	63
Total equity method investments	\$ 2,391	\$ 7,692

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 Tinum Services was not fully recoverable due to the remaining expected future cash distributions to be received as Tinum Services shuts its operations in 2022 as a result of the expiration of the Section 45 tax credit period as of December 31, 2021. As a result, the Company 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.

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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:

<i>(in thousands)</i>	Year ended December 31,	
	2021	2020
Earnings from Tinum Group	\$ 61,837	\$ 24,396
Earnings from Tinum Services	6,952	6,582
Loss from other	(63)	—
Earnings from equity method investments	\$ 68,726	\$ 30,978

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.

<i>(in thousands)</i>	Year ended December 31,	
	2021	2020
Distributions from equity method investees, return on investment		
Tinum Group	\$ 14,142	\$ 53,289
Tinum Services	8,802	9,152
	\$ 22,944	\$ 62,441
Distributions from equity method investees in excess of cumulative earnings		
Tinum Group	\$ 51,082	\$ —
	\$ 51,082	\$ —

Note 9 - Inventories, net

The following table summarizes the Company's inventories recorded at the lower of average cost or net realizable value as of December 31, 2021 and 2020:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Product inventory	\$ 4,901	\$ 8,361
Raw material inventory	2,949	1,521
	\$ 7,850	\$ 9,882

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Note 10 - Property, Plant and Equipment

The cost basis and accumulated depreciation of property, plant and equipment at December 31, 2021 and 2020 are summarized in the table below:

<i>(in thousands)</i>	Life in Years	As of December 31,	
		2021	2020
Land and land improvements	0-31	\$ 1,225	\$ 891
Plant and operating equipment	2-29	31,266	25,703
Furniture and fixtures	2-11	1,388	1,259
Machinery and equipment	2-10	697	688
Leasehold improvements	2-3	2,089	2,089
Construction in progress		1,190	2,143
		37,855	32,773
Less accumulated depreciation		(7,684)	(3,340)
Total property, plant and equipment, net		\$ 30,171	\$ 29,433

Included in plant and operating equipment as of December 31, 2021 and 2020 is mining equipment financed under various lease facilities, and obligations due under these facilities are included in finance lease obligations in the Consolidated Balance Sheets. The total amount recorded for ROU assets as of December 31, 2021 and 2020 related to finance lease obligations was \$1.7 million and \$2.4 million, respectively, net of accumulated depreciation of \$1.1 million and \$0.5 million.

Depreciation expense for the years ended December 31, 2021 and 2020 was \$5.5 million and \$6.8 million, respectively.

Note 11 - Debt Obligations

<i>(in thousands)</i>	Years ended December 31,	
	2021	2020
Finance lease obligations	\$ 4,163	\$ 5,526
Senior Term Loan principal, related party	—	16,000
Less: net unamortized debt issuance costs	—	(465)
Less: net unamortized debt discount	—	(480)
Senior Term Loan, net	—	15,055
PPP Loan	—	3,305
Total borrowings	4,163	23,886
Less: Current maturities	(1,011)	(18,441)
Total long-term borrowings	\$ 3,152	\$ 5,445

Senior Term Loan

On December 7, 2018, the Company, and ADA-ES, Inc. ("ADA"), a wholly-owned subsidiary, and certain other subsidiaries of the Company as guarantors, The Bank of New York Mellon as administrative agent, and Apollo Credit Strategies Master Fund Ltd and Apollo A-N Credit Fund (Delaware) L.P., affiliates of a beneficial owner of greater than five percent of the Company's common stock and a related party, entered into the Senior Term Loan in the amount of \$70.0 million, less original issue discount of \$2.1 million. The Company also paid debt issuance costs of \$2.0 million related to the Senior Term Loan.

On June 1, 2021 and prior to the Senior Term Loan's maturity date, the Company paid the remaining principal balance of the Senior Term Loan and all remaining accrued interest through this date. The Company did not incur any prepayment fees associated with the early pay-off.

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Line of Credit

In September 2013, ADA, as borrower, the Company, as guarantor, entered into the Line of Credit with the Lender for an aggregate principal amount of \$10.0 million that was secured by certain amounts due to the Company from certain Tivuum Group RC leases. The Line of Credit was amended 16 times from the period from December 2, 2013 through March 23, 2021, which included a reduction in the principal amount to \$5.0 million in September 2018.

On March 23, 2021, ADA, the Company and the Lender entered into an amendment to the Line of Credit (the "Fifteenth Amendment"), which extended the maturity date of the Line of Credit to December 31, 2021 and increased the minimum cash requirement from \$5.0 million to \$6.0 million.

On July 29, 2021, the Company and the Lender entered into the Sixteenth Amendment (the "Sixteenth Amendment") to the Line of Credit. The Sixteenth Amendment amends certain terms and conditions related to collateral securing the Line of Credit. As of December 31, 2021 and 2020, there were no outstanding borrowings under the Line of Credit. The Line of Credit expired on December 31, 2021.

Note 12 - Leases

The Company's operating and finance lease right-of-use ("ROU") assets and liabilities as of December 31, 2021 and 2020 consisted of the following items (in thousands):

Leases	Year ended December 31,	
	2021	2020
Operating Leases		
Operating lease right-of-use assets, net of accumulated amortization ⁽¹⁾	\$ 6,000	\$ 1,930
Operating lease obligations, current	\$ 2,157	\$ 1,883
Long-term operating lease obligations	4,178	1,109
Total operating lease obligation	<u>\$ 6,335</u>	<u>\$ 2,992</u>
Finance Leases		
Finance lease right-of-use assets, net of accumulated amortization ⁽²⁾	\$ 1,743	\$ 2,385
Finance lease obligations, current	\$ 1,011	\$ 1,550
Long-term finance lease obligations	3,152	3,976
Total finance lease obligations	<u>\$ 4,163</u>	<u>\$ 5,526</u>

(1) Operating lease assets are reported net of accumulated amortization of \$1.9 million and \$0.8 million as of December 31, 2021 and 2020, respectively.

(2) Finance lease assets are reported net of accumulated amortization of \$1.1 million and \$0.5 million as of December 31, 2021 and 2020, 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, 2021 and 2020.

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 respectively, in the Consolidated Statement of Operations for the years ended December 31, 2021 and 2020.

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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, 2021 and 2020.

Lease expense for operating leases for the year ended December 31, 2021 was \$4.0 million, of which \$3.5 million is included in "Consumables cost of revenues, exclusive of depreciation and amortization" line item and \$0.5 million is included in "General and administrative" line item in the Consolidated Statement of Operations for the year ended December 31, 2021. Lease expense for operating leases for the year ended December 31, 2020 was \$4.4 million, of which \$3.8 million is included in the "Consumables cost of revenues, exclusive of depreciation and amortization" line item and \$0.6 million is included in the "General and administrative" line item in the Consolidated Statement of Operations for the year ended December 31, 2020.

Lease financial information as of and for the years ended December 31, 2021 and 2020 is provided in the following table:

<i>(in thousands)</i>	Year ended December 31,	
	2021	2020
Finance lease cost:		
Amortization of right-of-use assets	\$ 642	\$ 1,471
Interest on lease liabilities	288	401
Operating lease cost	2,430	2,340
Short-term lease cost	1,650	2,067
Variable lease cost ⁽¹⁾	40	163
Total lease cost	\$ 5,050	\$ 6,442
Other Information:		
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from finance leases	\$ 288	\$ 401
Operating cash flows from operating leases	\$ 2,764	\$ 2,200
Financing cash flows from finance leases	\$ 1,190	\$ 1,360
Right-of-use assets obtained in exchange for new finance lease liabilities	\$ —	\$ 158
Right-of-use assets obtained in exchange for new operating lease liabilities	\$ 6,108	\$ 59
Weighted-average remaining lease term - finance leases	2.9 years	3.5 years
Weighted-average remaining lease term - operating leases	4.3 years	1.8 years
Weighted-average discount rate - finance leases	6.4 %	6.2 %
Weighted-average discount rate - operating leases	6.7 %	8.5 %

(1) Primarily includes common area maintenance, property taxes and insurance payable to lessors.

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The following table summarizes the Company's future lease payments under finance and operating leases as of December 31, 2021:

<i>(in thousands)</i>	Operating Lease Commitments	Finance Lease Commitments	Total Lease Commitments
2022	\$ 2,502	\$ 1,008	\$ 3,510
2023	2,005	980	2,985
2024	739	1,929	2,668
2025	566	569	1,135
2026	566	—	566
Thereafter	871	—	871
Total lease payments	7,249	4,486	11,735
Less: Imputed interest	(914)	(323)	(1,237)
Present value of lease payments	\$ 6,335	\$ 4,163	\$ 10,498

Note 13 - Revenues

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 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. The Company records allowances for doubtful trade receivables when it is probable that the balances will not be collected.

The following table shows the components of Trade receivables, net:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Trade receivables	\$ 10,476	\$ 12,241
Less: Allowance for doubtful accounts	—	(37)
Trade receivables, net	\$ 10,476	\$ 12,204

Cabot Receivable

The following table shows the components of the Cabot Receivable:

<i>(in thousands)</i>	As of	
	December 31, 2021	December 31, 2020
Receivables, net	\$ 2,146	\$ 921
Other long-term assets, net	6,846	8,852
Total Cabot Receivable	\$ 8,992	\$ 9,773

Upfront Customer Consideration

As described in Note 4, as of September 30, 2020, the Company recorded an asset for Upfront Customer Consideration of \$7.6 million in connection with the Supply Agreement, which is amortized on a straight-line basis as a reduction to revenue over the expected 15-year contractual period of the Supply Agreement. The unamortized balance is included in Other long-term assets, net on the Company's Consolidated Balance Sheets as of December 31, 2021 and 2020.

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Disaggregation of Revenue and Earnings from Equity Method Investments

For the years ended December 31, 2021 and 2020, all performance obligations related to revenues recognized were satisfied at a point in time. The Company disaggregates its revenues by its major components its two operating segments, which are further discussed in Note 19 to the consolidated financial statements. In the APT segment for the year ended December 31, 2021 and 2020, approximately 13% and 15%, respectively, of APT revenue was generated in Canada. The following tables disaggregate revenues by major source for the year ended December 31, 2021 and 2020:

<i>(in thousands)</i>	Year ended December 31, 2021		
	Segment		Total
	APT	RC	
Revenue component			
Consumables	\$ 85,882	\$ —	\$ 85,882
License royalties, related party	—	14,368	14,368
Other	44	—	44
Revenues from customers	85,926	14,368	100,294
Earnings from equity method investments	—	68,726	68,726
Total revenues and earnings from equity method investments	\$ 85,926	\$ 83,094	\$ 169,020

<i>(in thousands)</i>	Year ended December 31, 2020		
	Segment		Total
	APT	RC	
Revenue component			
Consumables ⁽¹⁾	\$ 53,908	\$ —	\$ 53,908
License royalties, related party	—	13,440	13,440
Other	15	—	15
Revenues from customers	53,923	13,440	67,363
Earnings from equity method investments	—	30,978	30,978
Total revenues and earnings from equity method investments	\$ 53,923	\$ 44,418	\$ 98,341

(1) Consumables revenues for the year ended December 31, 2020 have been restated. See restatement discussion in Note 2.

Note 14 - Commitments and Contingencies

Legal Proceedings

The Company is from time to time subject to, and is presently involved in, 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. The Company did not have any significant legal proceedings.

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Restricted Cash

As of December 31, 2021 and 2020, the Company had long-term restricted cash of \$10.0 million and \$5.0 million, respectively, as required under the Surety Agreement related to the Reclamation Contract. As of December 31, 2020, the Company had short-term restricted cash of \$5.0 million as required under a minimum cash balance requirement of a Senior Term Loan covenant.

Surety Bonds

As of December 31, 2021, the Company had outstanding surety bonds of \$24.1 million related to performance requirements under reclamation contracts associated with both the Five Forks Mine and the Marshall Mine.

Other Commitments and Contingencies

The Company also has certain limited obligations contingent upon future events in connection with the activities of Tinuum Group. The Company, NexGen and two entities affiliated with NexGen have provided GSFS with limited guaranties (the "Tinuum Group Party Guaranties") 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 Guaranties.

Note 15 - 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, 2021 and 2020, there were no shares of Preferred Stock designated or outstanding.

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.

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 otherwise modified by the Board.

For the years ended December 31, 2021 and 2020, under the Stock Repurchase Program, the Company purchased zero and 20,613 shares of its common stock for cash of zero and \$0.2 million, inclusive of commissions and fees, respectively. As of December 31, 2021, the Company had \$7.0 million remaining under the Stock Repurchase Program.

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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 net operating losses 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.

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") 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.

On April 9, 2021, the Board approved the Fourth Amendment to the TAPP ("Fourth Amendment") that amends the TAPP, as previously amended by the First, Second and Third Amendments that were approved the Board on April 6, 2018, April 5, 2019 and April 9, 2020, respectively. The Fourth Amendment amends the definition of "Final Expiration Date" under the TAPP to extend the duration of the TAPP and makes associated changes in connection therewith. At the Company's 2021 annual meeting of stockholders, the Company's stockholders approved the Fourth Amendment, thus the Final Expiration Date will be the close of business on December 31, 2022.

Note 16 - Stock-Based Compensation

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, 2021, the Company has 644,540 shares of its common stock authorized for issuance under the 2017 Plan.

Expense

RSA's - Restricted Stock Awards ("RSA's") are typically granted with vesting terms of three years. The fair value of RSA's 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 RSA's is generally recognized over the vesting term on a straight-line basis.

PSU's - 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.

Risk-free interest rate - The risk-free interest rate for PSU's 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 PSU's 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 upon the vesting term of the Company's PSU awards.

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

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
RSA expense	\$ 1,816	\$ 2,304
PSU expense	111	192
Total stock-based compensation expense	\$ 1,927	\$ 2,496

Stock-based compensation expense related to manufacturing employees and administrative employees is included in the "Consumables cost of revenues, excluding depreciation and amortization and "Payroll and benefits line items" in

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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.

The amount of unrecognized compensation cost as of December 31, 2021, and the expected weighted-average period over which the cost will be recognized is as follows:

<i>(in thousands)</i>	As of December 31, 2021	
	Unrecognized Compensation Cost	Expected Weighted- Average Period of Recognition (in years)
RSA expense	\$ 1,961	1.79
PSU expense	282	1.71
Total unrecognized stock-based compensation expense	\$ 2,243	1.62

Activity

Restricted Stock

A summary of activity of RSA's for the year ended December 31, 2021 is presented in the following table:

<i>(in thousands, except for share and per share amounts)</i>	Restricted Stock	Weighted-Average Grant Date Fair Value
	Awards	RSA's
For the year ended December 31, 2021		
Non-vested at January 1, 2021	373,860	\$ 7.25
Granted	445,383	\$ 5.54
Vested	(206,894)	\$ 7.47
Forfeited	(80,726)	\$ 5.90
Non-vested at December 31, 2021	531,623	\$ 5.94

The weighted-average grant date fair value of RSA's granted or modified for the years ended December 31, 2021 and 2020 was \$5.54 and \$5.20, respectively. The total grant-date fair value of RSA's vested for the years ended December 31, 2021 and 2020 was \$1.5 million and \$3.4 million, respectively. The aggregate intrinsic value of non-vested RSA's outstanding as of December 31, 2021 was \$3.5 million.

PSU's

PSU's outstanding remain unvested until 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.

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A summary of PSU activity for the year ended December 31, 2021 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, 2021				
PSU's outstanding, January 1, 2021	50,127	\$ 6.17		
Granted	62,448	7.09		
Vested / Settled	—	—		
Forfeited / Canceled	(24,549)	6.78		
PSU's outstanding, December 31, 2021	88,026	\$ 6.17	\$ 583	1.71

Note 17 - 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:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Prepaid expenses and other current assets:		
Prepaid expenses	\$ 2,571	\$ 1,690
Prepaid income taxes and income tax refunds	2,782	1,605
Other	1,308	1,302
	<u>\$ 6,661</u>	<u>\$ 4,597</u>
Other long-term assets:		
Upfront customer consideration ⁽¹⁾	\$ 6,982	\$ 7,490
Cabot receivable ⁽¹⁾	6,846	8,852
Right of use assets, operating leases, net	6,000	1,930
Spare parts, net	4,598	3,727
Mine development costs, net	5,330	4,338
Mine reclamation asset, net	1,742	1,712
Highview investment	552	552
Other long-term assets	1,193	1,388
	<u>\$ 33,243</u>	<u>\$ 29,989</u>

(1) See further discussion of Upfront Customer Consideration in Note 4 and Cabot Receivable in Note 5.

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 in the period in which they are consumed.

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 13 years as of December 31, 2021. 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.

The Company holds a long-term investment (the "Highview Investment") in Highview Enterprises Limited ("Highview"), a London, England based developmental stage company specializing in power storage. In November 2014, the Company acquired an 8% ownership interest in the common stock of Highview for \$2.8 million in cash. The Company accounts for the

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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.

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, 2021 and 2020 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.

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

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Other current liabilities:		
Current portion of operating lease obligations	\$ 2,157	\$ 1,883
Accrued interest	—	69
Income and other taxes payable	807	1,305
Current portion of mine reclamation liability	1,775	9,370
Other current liabilities	385	369
	\$ 5,124	\$ 12,996
Other long-term liabilities:		
Operating lease obligations, long-term	\$ 4,178	\$ 1,109
Mine reclamation liabilities	8,184	12,077
Other	—	287
	\$ 12,362	\$ 13,473

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:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Asset retirement obligations, beginning of year	\$ 21,447	\$ 2,721
Asset retirement obligations assumed	—	21,328
Accretion	1,102	543
Liabilities settled	(10,010)	(3,565)
Changes due to scope and timing of reclamation	(2,580)	420
Asset retirement obligations, end of year	9,959	21,447
Less current portion	1,775	9,370
Asset retirement obligations, long-term	\$ 8,184	\$ 12,077

Supplemental Consolidated Statements of Operations Information

Gain on Settlement

On December 29, 2020, the Company and a former customer (the "Parties") reached a settlement (the "Settlement") on various litigation matters (the "Litigation Matters") that resulted in the former customer (the "Former Customer") agreeing to pay to the Company cash of \$2.5 million (the "Settlement Amount"), which was received on January 27, 2021. This payment was in exchange for full dissolution of all claims and counterclaims that the two Parties asserted or could have asserted against each other in the Litigation Matters, or which have arisen or may arise against each other but are presently unknown, arising out of or related to the Litigation Matters and related to any other of the Parties' business dealings, conduct and/or transactions through

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the date of the Settlement, including all claims for damages, fees, costs, sanctions, or any other amounts due or to become due in connection with the foregoing. The Company applied the Settlement Amount cash proceeds to both an outstanding trade account receivable and note receivable due from the Former Customer and recognized the excess cash received as a gain of \$1.1 million, which is reported as "Gain on settlement" as a component of operating expenses in the Consolidated Statements of Operations for the year ended December 31, 2020.

Gain on Change in estimate, asset retirement obligation

As discussed in Note 4, 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:

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Interest on Senior Term Loan	\$ 206	\$ 1,708
Debt discount and debt issuance costs	945	1,418
453A interest	13	331
Other	326	463
	<u>\$ 1,490</u>	<u>\$ 3,920</u>

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

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Interest income	\$ 326	\$ 127
Other	314	5
	<u>\$ 640</u>	<u>\$ 132</u>

Note 18 - Income Taxes

The provision for income taxes consists of the following:

<i>(in thousands, except for rate)</i>	Years Ended December 31,	
	2021	2020
Current portion of income tax expense:		
Federal	\$ 2,741	\$ 1,666
State and other	2,326	1,354
	<u>5,067</u>	<u>3,020</u>
Deferred portion of income tax expense (benefit):		
Federal	9,527	5,068
State and other	1,078	(1,577)
	<u>10,605</u>	<u>3,491</u>
Total income tax expense	<u>\$ 15,672</u>	<u>\$ 6,511</u>
Effective tax rate	<u>21 %</u>	<u>(47)%</u>

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Income tax expense differed from the amount that would be computed by applying the U.S. statutory federal income tax rate of 21% to income before income taxes for the years ended December 31, 2021 and 2020 as follows:

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Federal statutory rate	\$ 15,975	\$ (2,896)
State income taxes, net of federal benefit	2,283	(410)
Permanent differences	(680)	326
Tax credits	(443)	(417)
Valuation allowances	(1,290)	9,148
Changes in tax rates	(33)	(97)
Stock-based compensation	86	285
Return to provision and other true-ups	(40)	572
Other	(186)	—
Income tax expense	\$ 15,672	\$ 6,511

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:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Deferred tax assets		
Tax credits	\$ 86,097	\$ 93,874
Equity method investments	1,584	5,149
Net operating loss carryforwards	2,388	2,906
Intangible assets	5,126	2,765
ARO, net of reimbursements	—	2,167
Employee related liabilities	1,971	827
Other investments	556	548
Operating lease obligations	1,585	508
Other	138	69
Total deferred tax assets	99,445	108,813
Less valuation allowance	(87,468)	(88,758)
Deferred tax assets	11,977	20,055
Less: Deferred tax liabilities		
Property and equipment and other	(8,203)	(7,039)
Upfront customer consideration	(1,747)	(1,847)
Right of use operating lease assets	(1,497)	(270)
Inventory	(197)	(295)
ARO, net of reimbursements	(333)	—
Total deferred tax liabilities	(11,977)	(9,451)
Net deferred tax assets	\$ —	\$ 10,604

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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 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, 2021, 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, 2021, the Company reduced a valuation allowance from December 31, 2020 by \$1.3 million, but as of December 31, 2021 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.

The following table presents the approximate amount of 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:

<i>(in thousands)</i>	As of December 31,		
	2021	Beginning expiration year	Ending expiration year
State and other operating loss carryforwards	\$ 2,388	2026	2036
Federal tax credit carryforwards	\$ 86,097	2032	2040

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, 2021 and 2020:

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Balance as of January 1	\$ 946	\$ 946
Lapse of applicable statute of limitations	(892)	—
Balance as of December 31	\$ 54	\$ 946

For the years ended December 31, 2021 and 2020, 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. Additionally, the Company recognizes interest expense related to the federal tax treatment of RC facilities at Tinnuum Group 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 17.

The Company files income tax returns in the U.S. and various states. The Company is no longer subject to U.S. federal examinations by tax authorities for years before 2018. The Company is generally no longer subject to state examinations by tax authorities for years before 2014.

Note 19 - Business Segment Information

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, 2021, the Company's CODM was the Company's CEO. The Company's operating and reportable segments are organized by products and services provided.

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As of December 31, 2021, the Company has two reportable segments: (1) Refined Coal ("RC"); and (2) Advanced Purification Technologies ("APT").

The business segment measurements provided to and evaluated by the CODM are computed in accordance with the principles listed below:

- The accounting policies of the operating segments are the same as those described in the summary of significant accounting policies except as described below.
- Segment revenues include equity method earnings and losses from the Company's equity method investments.
- Segment operating income (loss) includes segment revenues and allocation of certain corporate general and administrative expenses, which includes Payroll and benefits, General and administrative, and Depreciation, amortization, depletion and accretion.
- RC segment operating income includes interest expense directly attributable to the RC segment.

As of December 31, 2021 and 2020, substantially all of the Company's material assets were located in the U.S. and the majority of its customers are U.S. companies. The following table presents the Company's operating segment results for the years ended December 31, 2021 and 2020:

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Revenues:		
Refined Coal:		
Earnings in equity method investments	\$ 68,726	\$ 30,978
License royalties, related party	14,368	13,440
	<u>83,094</u>	<u>44,418</u>
Advanced Purification Technologies:		
Consumables ⁽¹⁾	85,882	53,908
Other	44	15
	<u>85,926</u>	<u>53,923</u>
Total segment reporting revenues	<u>169,020</u>	<u>98,341</u>
Adjustments to reconcile to reported revenues:		
Earnings in equity method investments	(68,726)	(30,978)
Total reported revenues	<u>\$ 100,294</u>	<u>\$ 67,363</u>
Segment operating income (loss)		
Refined Coal	\$ 82,634	\$ 42,689
Advanced Purification Technologies ⁽²⁾	5,649	(39,958)
Total segment operating income	<u>\$ 88,283</u>	<u>\$ 2,731</u>

(1) Revenues - Consumables for the year ended December 31, 2020 have been restated. See restatement discussion in Note 2.

(2) Included in APT segment operating income (loss) for the years ended December 31, 2021 and 2020 was \$7.4 million and \$7.9 million, respectively, of depreciation, amortization, depletion and accretion expenses on mine and plant related long-lived assets and liabilities. Further included in the APT segment operating income for the year ended December 31, 2021 was \$2.7 million related to a gain on change in estimate, asset retirement obligation. Additionally, included in APT segment operating loss for the year ended December 31, 2020 was an impairment charge of \$26.1 million and the Gain on Settlement of \$1.1 million.

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A reconciliation of reportable segment operating income to consolidated income (loss) before income taxes is as follows:

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
Total reported segment operating income	\$ 88,283	\$ 2,731
Adjustments to reconcile to income (loss) before income tax expense attributable to the Company:		
Corporate payroll and benefits	(2,478)	(2,866)
Corporate legal and professional fees	(6,014)	(4,954)
Corporate general and administrative	(3,358)	(5,096)
Corporate depreciation and amortization	(505)	(551)
Corporate interest expense, net	(854)	(3,060)
Other income, net	999	5
Income (loss) before income tax expense	\$ 76,073	\$ (13,791)

Corporate general and administrative expenses include certain costs that benefit the business as a whole but are not directly related to one of the Company's segments. Such costs include, but are not limited to, accounting and human resources staff, information systems costs, legal fees, facility costs, audit fees and corporate governance expenses.

A reconciliation of reportable segment assets to the Company's consolidated assets is as follows:

<i>(in thousands)</i>	As of December 31,	
	2021	2020
Assets:		
Refined Coal ⁽¹⁾	\$ 4,884	\$ 11,516
Advanced Purification Technologies ⁽²⁾	83,516	80,877
Total segment assets	88,400	92,393
Corporate ⁽³⁾	97,036	54,278
Consolidated	\$ 185,436	\$ 146,671

(1) Includes \$2.4 million and \$7.7 million of investments in equity method investees as of December 31, 2021 and 2020, respectively.

(2) Includes \$36.7 million and \$34.6 million of long-lived assets, net. Expenditures for additions to long-lived assets were \$7.4 million and \$7.3 million, respectively, for the years ended December 31, 2021 and 2020.

(3) Includes the Company's net deferred tax assets of zero and \$10.6 million as of December 31, 2021 and 2020, respectively.

Note 20 - Fair Value Measurements

Fair Value of Financial Instruments

The carrying amounts of financial instruments, including cash and cash equivalents, accounts receivable, accounts payable, deposits and accrued expenses, approximate their fair values due to the short maturity of these instruments. The carrying amounts of the Senior Term Loan and other obligations, including finance leases, approximate their fair values based on credit terms and market interest rates currently available for similar instruments. Accordingly, these instruments are not presented in the table below. The following table provides the estimated fair values of the remaining financial instruments:

<i>(in thousands)</i>	As of December 31, 2021		As of December 31, 2020	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Financial Instruments:				
Highview Investment	\$ 552	\$ 552	\$ 552	\$ 552
Highview Obligation	\$ 227	\$ 227	\$ 228	\$ 228

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Concentration of credit risk

As of December 31, 2021, 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 at three financial institutions as of December 31, 2021. If those institutions were unable to perform their obligations, the Company would be at risk regarding the amount of its cash balance in excess of the federal deposit insurance corporation limits (\$250 thousand).

Assets and Liabilities Measured at Fair Value on a Recurring Basis

As of December 31, 2021 and December 31, 2020, the Company had no material financial instruments carried and measured at fair value on a recurring basis.

Assets and Liabilities Measured at Fair Value on a Non-Recurring Basis

As disclosed in Note 4, the Company completed the asset acquisition of Marshall Mine, LLC. The estimated fair values of the assets acquired and liabilities assumed were determined based on Level 3 inputs.

As disclosed in Note 6, the Company recorded an impairment charge related to the Asset Group based on a valuation model that included an expected future discounted cash flow model using Level 3 inputs.

As noted in Note 17, 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 either Level 2 or Level 3 measurements.

Note 21 - Major Customers

Revenues from external customers who represent 10% or more of the Company's revenues for the years ended December 31, 2021 and 2020 were as follows:

Customer	Revenue Type	Segment(s)	Years ended December 31,	
			2021	2020
A	License royalties, related party	RC	14%	20%
B	Consumables ⁽¹⁾	APT	14%	6%
C	Consumables ⁽¹⁾	APT	10%	11%

(1) Consumables revenues for the year ended December 31, 2020 have been restated. See restatement discussion in Note 2.

Note 22 - Related Party Transactions

Accounts Receivable

The following table shows the Company's receivable balance associated with related parties as of December 31, 2021 and 2020:

(in thousands)	As of December 31,	
	2021	2020
Receivable from related party - Tinum Group	\$ 2,481	\$ 3,453

Revenues

The following table shows the income recognized with related parties during the years ended December 31, 2021 and 2020:

(in thousands)	Years Ended December 31,	
	2021	2020
License royalties, related party - Tinum Group	\$ 14,368	\$ 13,440

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

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

Note 23 - 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.

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

<i>(in thousands)</i>	Years Ended December 31,	
	2021	2020
401(k) Plans employer contributions	\$ 479	\$ 484

Note 24 - Quarterly Financial Results (unaudited)

Summarized quarterly results for the two years ended December 31, 2021 and December 31, 2020 are as follows:

<i>(in thousands, except per share data)</i>	For the Quarter Ended			
	December 31, 2021	September 30, 2021	June 30, 2021	March 31, 2021
Revenues	\$ 25,764	\$ 30,858	\$ 21,065	\$ 22,607
Cost of revenues	16,904	19,956	14,732	13,984
Other operating expenses	8,076 (1)	7,603	5,894	8,293
Operating income	784	3,299	439	330
Earnings from equity method investments	6,782	22,195	21,437	18,312
Other (expenses) income, net	(86)	3,340	(343)	(416)
Income before income tax expense	7,480	28,834	21,533	18,226
Income tax expense	1,659	4,581	4,943	4,489
Net income	\$ 5,821	\$ 24,253	\$ 16,590	\$ 13,737
Earnings per common share – basic	\$ 0.32	\$ 1.33	\$ 0.91	\$ 0.76
Earnings per common share – diluted	\$ 0.31	\$ 1.31	\$ 0.90	\$ 0.75
Weighted-average number of common shares outstanding				
Basic	18,302	18,292	18,271	18,166
Diluted	18,545	18,489	18,398	18,274

(1) During the fourth quarter of 2021, the Company recorded a gain on change in estimate, asset retirement obligation of \$0.8 million related to the Company revising its estimate of future obligations owed for the reclamation of Marshall Mine as further described in Note 17.

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

<i>(in thousands, except per share data)</i>	For the Quarter Ended			
	December 31, 2020	September 30, 2020	June 30, 2020	March 31, 2020
Revenues	\$ 19,743	\$ 21,270	\$ 12,726	\$ 13,624
Cost of revenues	12,076	16,812	8,659	12,852
Other operating expenses	6,117 (1)	7,283	35,132	9,413
Operating income (loss)	1,550	(2,825)	(31,065)	(8,641)
Earnings from equity method investments	5,019	9,518	8,168	8,273
Other expenses, net	(943)	(864)	(814)	(1,167)
Income (loss) before income tax expense	5,626	5,829	(23,711)	(1,535)
Income tax expense	5,196 (2)	854	103	358
Net income (loss)	\$ 430	\$ 4,975	\$ (23,814)	\$ (1,893)
Earnings (loss) per common share – basic	\$ 0.02	\$ 0.27	\$ (1.32)	\$ (0.11)
Earnings (loss) per common share – diluted	\$ 0.02	\$ 0.27	\$ (1.32)	\$ (0.11)
Weighted-average number of common shares outstanding				
Basic	18,109	18,093	18,014	17,932
Diluted	18,167	18,103	18,014	17,932

(1) During the fourth quarter of 2020, the Company recorded a gain of 1.1 million related to the Settlement reached with the Former Customer as further described in Note 17.

(2) During the fourth quarter of 2020, the Company recorded income tax expense of \$5.2 million primarily due to an increase in the valuation allowance as of December 31, 2020 related to the Company's deferred tax assets.

As discussed in Note 2, the Company concluded that its historical presentation of shipping and handling costs billed to customers as a component of cost of revenues rather than as a component of revenues was incorrect and that the Company's presentation of both the "Revenues - Consumables" and "Consumables cost of revenues, exclusive of depreciation and amortization" line items for the year ended December 31, 2020 should be restated. The impact of this error resulted in an understatement of both the "Revenues - Consumables" and "Consumables cost of revenues, exclusive of depreciation and amortization" line items in the Consolidated Statements of Operations for each of the quarters included in 2020 and for the quarters ended March 31, 2021, June 30, 2021 and September 30, 2021 and is shown below for those periods. The amounts reported above for the three months ended March 31, 2021 and 2020, the three months ended June 30, 2021 and 2020, the three months ended September 30, 2021 and 2020 and the three months ended December 31, 2020 have been restated for this error. There was no impact to operating income (loss), income (loss) before income taxes, net income (loss) or earnings (loss) to any of the 2021 or 2020 periods.

The adjustments for restatement of the quarters ended September 30, 2021, June 30, 2021, and March 31, 2021 are as follows:

	For the Quarter Ended		
	September 30, 2021 (Restated)	June 30, 2021 (Restated)	March 31, 2021 (Restated)
	Increase / (Decrease)	Increase / (Decrease)	Increase / (Decrease)
Revenues	2,004	1,432	1,510
Cost of revenues	2,004	1,432	1,510
Operating income	—	—	—

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

The adjustments for restatement of the quarters ended December 31, 2020, September 30, 2020, June 30, 2020, and March 31, 2020 are as follows:

	For the Quarter Ended			
	December 31, 2020 (Restated)	September 30, 2020 (Restated)	June 30, 2020 (Restated)	March 31, 2020 (Restated)
	Increase / (Decrease)	Increase / (Decrease)	Increase / (Decrease)	Increase / (Decrease)
Revenues	1,383	1,799	1,243	1,361
Cost of revenues	1,383	1,799	1,243	1,361
Operating income	—	—	—	—

Note 25 - 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, 2021.

On February 25, 2022, the Company received \$10.6 million in cash from Cabot (the "Cabot 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 Cabot by its parent, Cabot Corporation. Under the Change in Control, the Company received from Cabot 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 additional Reclamation Costs (the "Cabot Reclamation Costs"). Under the Reclamation Contract, the Company is obligated to remit payment for the Cabot Reclamation Costs to the third party operator of Marshall Mine within a specified timeframe. The Company will account for the Cabot Payment in its March 31, 2022 quarter and does not anticipate any impacts to the Supply Agreement except as described above.

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 not effective as of December 31, 2021 due to a material weakness in our internal control over financial reporting described below.

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 not effective as of December 31, 2021 due to the material weakness described below.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of the Company's annual or interim financial statements will not be prevented or detected on a timely basis.

During the assessment process, 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 a result of these deficiencies, as described in Note 2 to the consolidated financial statements included in Item 8. "Financial Statements and Supplementary Data," the Company identified and corrected immaterial errors in previously reported revenues due to freight revenue being improperly classified as consumables cost of revenue instead of consumables revenues. The material weakness did not result in a material misstatement of our historical consolidated financial statements.

Management developed a plan to remediate the material weakness described above. Remediation efforts include (1) changes to the design of controls relating to the selection and application of accounting principles and the evaluation of changes in interpretative guidance relating to previously implemented accounting standards and (2) implementing an annual review of key accounting policies. The implementation of the remediation plan is in progress, and we expect to design and implement these changes in internal controls during the first half of fiscal year 2022.

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 2021 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

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, 2021.

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, 2021.

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, 2021, 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 16 - 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, 2021:

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)	—	\$ —	880,564
Equity compensation plans not approved by security holders	—	\$ —	—
Total	—		880,564

(1) Includes securities registered for issuance under the ADA-ES Profit Sharing Retirement Plan and the 2017 Omnibus Incentive Plan.

(2) The number of securities is reduced by 531,623 shares of restricted common stock for which restrictions have not lapsed.

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, 2021.

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, 2021.

Item 15. Exhibits and Financial Statement Schedules

- (a) The following consolidated financial statements of Advanced Emissions Solutions, 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.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date
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	Conformed Copy of the Bylaws of Advanced Emissions Solutions, Inc., as amended	10-K	001-37822	3.2	March 12, 2018
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
4.1	Form of Specimen Common Stock Certificate	10-Q	000-54992	4.1	August 9, 2013
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	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	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	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	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
10.1	Advanced Emissions Solutions, Inc. 2017 Omnibus Incentive Plan**	8-K	001-37822	10.1	June 22, 2017
10.2	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
10.3	Form of Amendment No. 2 to Employment Agreement of Greg Marken**	10-Q	001-37822	10.1	August 6, 2018
10.4	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
10.5	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	Employment Agreement dated February 26, 2021 between the Company and Morgan Fields**, ***	8-K	001-37822	10.1	March 3, 2021
10.7	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	Retention Agreement dated May 5, 2021 between the Company and Joe Wong**, ***	10-Q	001-37822	10.5	May 10, 2021

Exhibit No.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date
10.9	Employment Agreement dated May 7, 2020, between the Company and Christine Bellino** ***	8-K	001-37822	10.1	May 11, 2020
10.10	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
10.11	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
10.12	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
10.13	Contribution Agreement dated May 27, 2011 between ADA-ES, Inc. and NexGen Refined Coal, LLC	10-Q	000-50216	10.87	August 12, 2011
10.14	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
10.15	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
10.16	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
10.17	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
10.18	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
10.19	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
10.20	Amendment #2 to Technology Sublicense Agreement between ADA-ES, Inc., GS RC Investments, LLC, and Clean Coal Solutions, LLC dated December 15, 2011	10-K	000-50216	10.49	March 15, 2012
10.21	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
10.22	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
10.23	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
10.24	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
10.25	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.	Description	Form	File No.	Incorporated by Reference Exhibit	Filing Date
10.26	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
10.27	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
10.28	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
21.1	Subsidiaries of Advanced Emissions Solutions, Inc.*				
23.1	Consent of Moss Adams LLP*				
23.2	Consent of Moss Adams LLP*				
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)*				
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	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*				
95	Mine Safety Disclosure Exhibit*				
101	The following financial statements, formatted in XBRL: (i) Consolidated Balance Sheets as of December 31, 2021 and 2020, (ii) Consolidated Statements of Operations for the Years ended December 31, 2021 and 2020, (iii) Consolidated Statements of Changes in Stockholders' Equity for the Years ended December 31, 2021 and 2020, (iv) Consolidated Statements of Cash Flows for the Years ended December 31, 2021 and 2020; 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 confidential treatment.

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.

(c) The following financial statements are included in this Report:

(1) Tinum Group, LLC and Subsidiaries;

a. Consolidated Financial Statements, December 31, 2021 and 2020 (with Independent Auditors' Reports thereon);

Tinum Group, LLC and Subsidiaries
CONSOLIDATED FINANCIAL STATEMENTS
As of and for the Years Ended
December 31, 2021 and 2020

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Report of Independent Auditors

To the Board of Managers and Members
Tinum Group, LLC

Report on the Audit of the Financial Statements

Opinion

We have audited the consolidated financial statements of Tinum Group, LLC and its subsidiaries, which comprise the consolidated balance sheets as of December 31, 2021 and 2020, and the related consolidated statements of operations, members' equity, and cash flows for the years then ended and the related notes to the consolidated financial statements.

In our opinion, the accompanying consolidated financial statements present fairly, in all material respects, the financial position of Tinum Group, LLC and its subsidiaries as of December 31, 2021 and 2020, and the results of their operations and their cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audits in accordance with auditing standards generally accepted in the United States of America (GAAS). Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of Tinum Group, LLC and its subsidiaries and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audits. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the consolidated financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the consolidated financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about Tinum Group, LLC and its subsidiaries' ability to continue as a going concern within one year after the date that the consolidated financial statements are issued.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the consolidated financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the consolidated financial statements.

In performing an audit in accordance with GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the consolidated financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of Tinum Group, LLC and its subsidiaries' internal control. Accordingly, no such opinion is expressed.

- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the consolidated financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about Tinum Group, LLC and its subsidiaries' ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control–related matters that we identified during the audit.

Emphasis of Matter Regarding Going Concern

The accompanying consolidated financial statements have been prepared assuming that Tinum Group, LLC and its subsidiaries will continue as a going concern. As discussed in Note 1 to the consolidated financial statements, with the expiration of the production tax credit (PTC) as of December 31, 2021 all third-party investor contracts have expired or been terminated and Tinum Group, LLC and its subsidiaries have terminated reduced emissions fuel production as of December 31, 2021, which has led to cash inflows ending in January 2022. To date, management has not developed an alternative business strategy that would support continued business operations. Given these events and conditions, substantial doubt exists about the Tinum Group, LLC and its subsidiaries' ability to continue as a going concern. Management's evaluation of the events and conditions and management's plans regarding these matters are also described in Note 1. The consolidated financial statements do not include any adjustments that might result from the outcome of this uncertainty. Our opinion is not modified with respect to this matter.

/s/ Moss Adams LLP

Denver, Colorado
March 4, 2022

TINUUM GROUP, LLC AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
As of December 31, 2021 and 2020
(in thousands)

	2021	2020
ASSETS		
CURRENT ASSETS		
Cash and cash equivalents	\$ 28,156	\$ 50,540
Accounts receivable	7,727	8,029
Related party receivables	102	—
Income tax receivable	—	5,966
Contract receivables – current	3,342	47,264
Contract costs – current	—	5,541
Inventory	—	13,730
Other current assets	60	11,370
Total current assets	39,387	142,440
Fixed assets, net	220	24,508
Contract receivables – long term	—	4,122
Other assets, net	—	19
TOTAL ASSETS	\$ 39,607	\$ 171,089

The following table presents certain assets of the consolidated variable interest entities ("VIEs"), which are included in the Consolidated Balance Sheets above. The assets in the table below include those assets that can only be used to settle obligations of consolidated VIEs, presented on the following page, and are in excess of those obligations. Additionally, the assets in the table below include third-party assets of consolidated VIEs only and exclude intercompany balances that eliminate in consolidation.

Assets of Consolidated VIEs to be Used to Settle Obligations of Consolidated VIEs

	2021	2020
ASSETS		
Cash and cash equivalents	\$ 9,539	\$ 32,050
Accounts receivable	3,001	25
Income tax receivable	—	5,966
Inventory	—	13,724
Other current assets	—	403
Non-current assets	—	10,631
TOTAL ASSETS	\$ 12,540	\$ 62,799

Statement continues on the next page
The accompanying notes are an integral part of the consolidated financial statements

TINUUM GROUP, LLC AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
As of December 31, 2021 and 2020
(in thousands)

LIABILITIES AND MEMBERS' EQUITY

	2021	2020
CURRENT LIABILITIES		
Accounts payable	\$ 1,057	\$ 6,446
Accrued liabilities	4,235	6,568
Related party payables	6,636	7,653
Deferred revenue	—	11,898
Note payable to customer	—	5,400
Secured promissory notes	—	6,313
Asset retirement obligations	1,795	—
Accrued retention compensation	1,835	—
Total current liabilities	15,558	44,278
Asset retirement obligations	—	2,070
Accrued retention compensation	—	3,116
TOTAL LIABILITIES	15,558	49,464
MEMBERS' EQUITY		
Members' equity attributable to Class A Members	8,890	59,221
Member equity attributable to Class B Member	9,887	18,769
Noncontrolling interests	5,272	43,635
Total Members' equity	24,049	121,625
TOTAL LIABILITIES AND MEMBERS' EQUITY	\$ 39,607	\$ 171,089

The following table presents certain liabilities of consolidated VIEs, which are included in the Consolidated Balance Sheets above. The liabilities in the table below include third-party liabilities of consolidated VIEs only and exclude intercompany balances that eliminate in consolidation. The liabilities also exclude intercompany amounts where creditors have recourse against the general credit of Tinum Group, LLC.

Liabilities of Consolidated VIEs for Which Creditors Do Not Have Recourse Against the General Credit of Tinum Group, LLC

	2021	2020
LIABILITIES		
Accounts payable and accrued liabilities	\$ 1,244	\$ 7,859
Related party payables	2,358	3,747
Secured promissory notes	—	6,313
Non-current liabilities	1,795	1,670
TOTAL LIABILITIES	\$ 5,397	\$ 19,589

The accompanying notes are an integral part of the consolidated financial statements.

TINUUM GROUP, LLC AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS
For the Years Ended December 31, 2021 and 2020
(in thousands)

	2021	2020
REVENUES		
Reduced emissions and unrefined fuel	\$ 776,397	\$ 619,101
REF Facility revenues – over time	104,905	89,478
REF Facility revenues – point-in-time	(2,643)	(1,129)
Other	606	594
TOTAL REVENUES	879,265	708,044
COST OF SALES (exclusive of depreciation shown separately below)		
Feedstock purchases	776,397	619,101
Cost of REF facilities	—	(12)
Chemicals	37,260	27,496
Site and production fees	38,091	35,950
Royalties and fees	20,522	18,860
TOTAL COST OF SALES	872,270	701,395
GROSS PROFIT	6,995	6,649
OPERATING EXPENSES	13,881	11,217
IMPAIRMENT OF REF FACILITIES	15	2,968
DEPRECIATION AND AMORTIZATION EXPENSE	24,101	28,175
SELLING, GENERAL AND ADMINISTRATIVE EXPENSES	11,417	15,648
LOSS FROM OPERATIONS	(42,419)	(51,359)
OTHER (INCOME) EXPENSE		
Interest income	(570)	(1,744)
Other expense	(536)	655
Interest expense	88	1,671
TOTAL OTHER (INCOME) EXPENSE	(1,018)	582
LOSS BEFORE INCOME TAXES	(41,401)	(51,941)
Deferred tax benefit	(9,769)	(18,979)
Income tax expense	1,061	1,137
NET LOSS	(32,693)	(34,099)
Loss attributable to noncontrolling interests	126,948	91,501
NET INCOME AVAILABLE TO MEMBERS	\$ 94,255	\$ 57,402

The accompanying notes are an integral part of the consolidated financial statements.

TINUUM GROUP, LLC AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF MEMBERS' EQUITY
Years Ended December 31, 2021 and 2020
(in thousands)

	Class A Members	Class B Member	Non-Controlling Interests	Total Members' Equity
BALANCES, JANUARY 1, 2020	\$ 117,006	\$ 28,967	\$ 35,588	\$ 181,561
Member contributions	—	—	113,465	113,465
Member distributions	(106,577)	(18,808)	—	(125,385)
Member distributions, noncontrolling interests	—	—	(13,917)	(13,917)
Net income available to members	48,792	8,610	—	57,402
Net loss attributable to noncontrolling interests	—	—	(91,501)	(91,501)
BALANCES, DECEMBER 31, 2020	59,221	18,769	43,635	121,625
Member contributions	—	—	104,450	104,450
Member distributions	(130,448)	(23,020)	—	(153,468)
Member distributions, noncontrolling interests	—	—	(15,865)	(15,865)
Net income available to members	80,117	14,138	—	94,255
Net loss attributable to noncontrolling interests	—	—	(126,948)	(126,948)
BALANCES, DECEMBER 31, 2021	\$ 8,890	\$ 9,887	\$ 5,272	\$ 24,049

The accompanying notes are an integral part of the consolidated financial statements.

TINUUM GROUP, LLC AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
For the Years Ended December 31, 2021 and 2020
(in thousands)

	2021	2020
CASH, BEGINNING OF YEAR	\$ 50,540	\$ 44,441
CASH FLOWS FROM OPERATING ACTIVITIES		
Net loss	(32,693)	(34,099)
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	24,101	28,175
Amortization of contract costs	5,541	21,188
Noncash operating lease expense	182	176
Assets sold as part of REF Facility transaction	—	(12)
(Gain)/loss on sale of assets	(384)	264
Impairment of REF facilities	(15)	2,968
Gain on removal of asset retirement obligation	(131)	(194)
Accretion of asset retirement obligation	399	184
Effects of changes in operating assets and liabilities:		
Accounts receivable	302	(1,943)
Related party receivables	(102)	—
Income tax receivable	5,966	(5,062)
Contract receivables	48,044	43,117
Inventory	13,730	(1,864)
Other assets	11,329	8,047
Accounts payable and accrued liabilities	(7,509)	1,010
Accrued retention compensation	(1,281)	3,116
Payments on operating leases	(213)	(200)
Related party payables	(863)	(2,196)
Deferred revenue	(11,898)	2,088
Settlement of asset retirement obligation	(543)	—
Net cash provided by operating activities	<u>53,962</u>	<u>64,763</u>
CASH FLOWS FROM INVESTING ACTIVITIES		
Capital expenditures for fixed assets	—	(5,648)
Proceeds from sale of fixed assets	250	99
Net cash provided by/(used) in investing activities	<u>250</u>	<u>(5,549)</u>
CASH FLOWS FROM FINANCING ACTIVITIES		
Borrowings under line of credit	—	8,900
Repayments under line of credit	—	(14,400)
Repayments on note payable to customer	(5,400)	(21,600)
Repayments under secured promissory note	(6,313)	(178)
Contributions from noncontrolling interest members	104,450	113,465
Distributions paid to minority interest members	(15,865)	(13,917)
Distributions paid to members	(153,468)	(125,385)
Net cash used in financing activities	<u>(76,596)</u>	<u>(53,115)</u>
NET (DECREASE)/INCREASE IN CASH	<u>(22,384)</u>	<u>6,099</u>

The accompanying notes are an integral part of the consolidated financial statements.

TINUUM GROUP, LLC AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
For the Years Ended December 31, 2021 and 2020
(in thousands)

	2021	2020
CASH, END OF YEAR	\$ 28,156	\$ 50,540
SUPPLEMENTAL DISCLOSURES		
Cash paid for interest	\$ 104	\$ 1,824
Cash paid for taxes	1,207	1,212
NON-CASH TRANSACTIONS		
Asset proceeds included in reduction of accounts payable	\$ 154	\$ —
Capital expenditures included in related party payables	—	429
Asset retirement obligation layer	—	631

The accompanying notes are an integral part of the consolidated financial statements.

TINUUM GROUP, LLC AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
DECEMBER 31, 2021 and 2020
(in thousands)

NOTE 1 - SIGNIFICANT ACCOUNTING POLICIES

Tinum Group, LLC (together with its subsidiaries, "Tinum" or "TG" or the "Company") develops, manages, sells and leases facilities ("REF Facilities") used in the production and sale of reduced emissions fuel ("REF" or refined coal). The production and sale of REF via these REF Facilities qualifies for production tax credits that are available under Section 45 of the Internal Revenue Code ("PTCs"). The value of the PTC is adjusted annually based on inflation adjustment factors published in the Federal Register. The 2021 and 2020 PTC rates were \$7.384 and \$7.301 per ton of REF produced, respectively. The PTC period expired as of December 31, 2021 and as a result the Company has ceased production of REF.

Tinum is owned 42.5% by ADA-ES, Inc. ("ADA"), 42.5% by NexGen Refined Coal, LLC ("NexGen") (collectively, Class A Members), and 15% by GSFS Investments I Corp. ("GSFS" or the "Class B Member"). ADA, NexGen, and GSFS are collectively referred to herein as the "Members."

Tinum placed in service 28 REF Facilities prior to January 1, 2012. Each REF Facility has demonstrated the required emissions reductions from the production of REF to qualify for PTCs. The REF produced at these REF Facilities is burned at coal-fired generation stations (the owner of which is a "Generator") and continues to qualify for PTCs for a period of 10 years following the applicable placed in service date. The 28 REF Facilities, of which 23 were operating during the year ended December 31, 2021, no longer qualified for PTCs as of December 31, 2021. Two of the REF Facilities' ability to produce PTCs ended during December 2019 since those two REF Facilities were placed in service in 2009.

REF Facilities were either sold to or were under lease with third-party investors ("TP Investors") who utilize the REF Facilities to produce REF (each of these REF Facilities is owned or leased by a "Producer Entity"). Some of the Producer Entities are owned or leased exclusively by a TP Investor and some are owned or leased by a TP Investor with some ownership percentage retained by the Company. The REF Facilities are located at coal-fired generation stations throughout the United States. In instances where Tinum retains certain member interests in a Producer Entity, PTCs generated are allocated to Tinum in proportion to its member interests and are therefore available for the benefit of Tinum's Members. As of December 31, 2020, 23 REF Facilities had been sold or were under lease to TP Investors. For the year ended December 31, 2021, 23 REF Facilities were owned or leased by TP Investors for some portion of the year ranging from six to nearly twelve months. All 23 REF Facilities had ceased operations as of December 31, 2021.

Tinum Services, LLC ("TS"), operates and maintains the REF Facilities under respective operating and maintenance agreements. TS is owned 50% each by ADA and NexGen and is not consolidated with the accounts of Tinum. TP Investors of REF Facilities pay TS, subject to certain limitations, a fee for procuring certain proprietary chemical additives, an operating fee for the production of REF, and for the other operating and maintenance costs associated with running the REF Facilities.

Basis of Presentation

The accompanying consolidated financial statements are presented in accordance with accounting principles generally accepted in the United States of America ("GAAP") and include the accounts of the Company and several variable interest entities ("VIEs"), for which Tinum is the primary beneficiary. An entity is referred to as a VIE if it meets any of the following criteria outlined in Accounting Standard Codification 810 - *Consolidation* ("ASC 810"), which are: (i) the entity has equity that is insufficient to permit the entity to finance its activities without additional subordinated financial support from other parties; (ii) the entity has equity investors that, as a group, lack the characteristics of a controlling financial interest; or (iii) the entity is structured with non-substantive voting rights.

The Company consolidates a VIE when it has both the power to direct the activities that most significantly impact the VIE's economic performance and the obligation to absorb losses of the entity that could be potentially significant to the VIE (i.e., it is the primary beneficiary).

All intercompany balances and transactions have been eliminated in consolidation.

Going Concern

Currently, with the expiration of the PTCs as of December 31, 2021, all TP Investor contracts have expired or been terminated and the Company has terminated REF production, which has led to cash inflows to TG ending in January 2022. To date, management has not developed an alternative business strategy that would support continued business operations. Management continues to engage in efforts to pursue an extension of the PTC period by the U.S. Congress, though at present no such

TINUUM GROUP, LLC AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
DECEMBER 31, 2021 and 2020
(in thousands)

extension has been adopted. In the event of a PTC extension in a timely manner, management would investigate any opportunity to continue REF production.

Debt financing is no longer available to the Company.

Management has budgeted, and is planning, to reserve enough cash from the final cash inflows of 2021 and 2022 to satisfy anticipated remaining liabilities and obligations. These cash reserves will be utilized to conduct an orderly wind down of business operations. The decision to commence liquidation of the Company will be subject to approval by the Members.

Management has concluded that these factors, in the aggregate, raise substantial doubt about the Company's ability to continue as a going concern. The consolidated financial statements have been prepared on a basis which assumes the Company will be able to continue as a going concern and contemplates the realization of assets and satisfaction of liabilities in the normal course of business, and does not include any adjustments to reflect the possible future effects on the recoverability and classification of assets or the amounts and classifications of liabilities that may result from uncertainty related to the Company's ability to continue as a going concern.

Use of Estimates

The preparation of financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenue and expenses during the reporting period. Management bases its estimates on historical experience and on various other assumptions that are believed to be reasonable under the circumstances. Significant estimates include the estimated contingent revenues recognized related to revenues recognized at a point-in-time, assumptions associated with asset retirement obligations ("ARO") and the final realization of remediation efforts, and the estimate for any outstanding contingent liabilities. Ultimate realization of assets and settlement of liabilities in the future could differ from these estimates.

Cash and Cash Equivalents

The Company considers all highly liquid investments with original maturities of three months or less to be cash equivalents. The carrying value approximates fair value due to the short-term nature of these instruments. The Company maintains its cash and cash equivalents in accounts with a local financial institution. These accounts at times may exceed federally insured limits. The Company has not experienced any losses in these accounts and believes it is not exposed to any significant credit risk related to cash and cash equivalents.

Accounts Receivable

Accounts receivable consist primarily of payments due from TP Investors that own or lease the REF Facilities. The carrying amount of accounts receivable may be reduced by a valuation allowance that reflects management's best estimate of amounts that will not be collected. Under the Company's agreements, interest can accrue on delinquent balances. No interest on delinquent balances was recorded for the years ended December 31, 2021 and 2020. Any allowance for doubtful accounts is based on management's assessment of the collectability of specific customer accounts and the aging of the accounts receivable. If there is a deterioration of a major customer's credit worthiness or actual defaults are higher than the historical experience, management's estimates of the recoverability of amounts due to the Company could be adversely affected. As of December 31, 2021 and 2020, no allowance for doubtful accounts was considered necessary.

Inventory

Inventory is comprised primarily of feedstock fuel and chemicals used in the production and sale of REF at REF Facilities. Inventory is valued at the lower of cost or net realizable value using the average cost method.

Fixed Assets

Fixed assets are stated at historical cost less accumulated depreciation and consist primarily of the REF Facilities and ancillary equipment, including major additions and improvements. Expenditures for major improvements are capitalized, while maintenance and repair costs that do not significantly improve the related asset or extend its useful life are charged to expense as incurred. For financial reporting purposes, depreciation is calculated using the straight-line method over the estimated useful lives of the assets ranging from 3 to 10 years.

The Company records an ARO liability equal to the fair value of the estimated cost to retire a REF Facility. The ARO liability is initially recorded in the period in which the obligation meets the definition of a liability, which is generally when a REF

TINUUM GROUP, LLC AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
DECEMBER 31, 2021 and 2020
(in thousands)

Facility is installed at a generation station ("Site"). The ARO liability is estimated by the Company based on legal removal requirements, historical removal experience, and anticipated future inflation rates. When the liability is initially recorded, the Company increases the carrying amount of the related long-lived asset by an amount equal to the original liability. The liability is increased over time to reflect the change in its present value, and the capitalized cost is depreciated over the useful life of the related long-lived asset. The ARO liability is removed when the Company is relieved of its removal obligation due to either completion of the removal activities at a Site or a transfer of the responsibility for the REF Facility removal to a third party. The Company reevaluates the adequacy of its recorded ARO liability at least annually. Actual costs of asset retirements, such as removing the REF Facility from a Site and related Site restoration, are charged against the related liability. Any difference between costs incurred upon settlement of an ARO and the recorded liability is recognized in other expense as a gain or loss in the Company's consolidated statements of operations.

Intangible Assets

Tinum has two exclusive licenses from ADA for the patented and proprietary "CyClean™" and "M-45™" technologies related to the production of REF. The patents underlying the CyClean™ technology license expire beginning in 2021; however, the license agreement includes potential future patents related to the technology. The costs associated with the exclusive CyClean™ license are included in other assets, net on the consolidated balance sheets and are being amortized over the useful economic life of the technology, or approximately 14 years, using the straight-line method. Amortization expense was \$0 and \$5 for each of the years ended December 31, 2021 and 2020, respectively.

Impairment of Long-Lived Assets

The Company reviews long-lived assets for impairment whenever events or changes in circumstances indicate the carrying amount of an asset may not be recoverable. Recoverability of assets to be held and used is measured by a comparison of the carrying amount of an asset to future undiscounted net cash flows expected to be generated by the asset. If such assets are considered to be impaired, the impairment to be recognized is measured by the amount by which the carrying amount of the assets exceeds the fair value of the assets. Assets to be disposed of are reported at the lower of carrying amount or fair value less costs to sell. As part of the Company's on-going monitoring of its REF Facilities, the Company evaluated the REF Facility assets for potential impairment as of December 31, 2020. Given the expiration of the original PTC period, December 31, 2021, and the fact that the Company does not have an expectation of additional future cash flows associated with the REF Facilities beyond the PTC period, any REF Facilities that had not been invested by TP Investors have been considered to be impaired. Impairment was assessed based upon the future undiscounted cash flows of each REF Facility as compared to its net book value. As a result, the Company recognized an impairment loss of \$15 and \$2,968 as of and for the years ended December 31, 2021 and 2020, respectively.

Revenue Recognition

REF Facilities

The Company identifies performance obligations by reviewing the combination of customer agreements for material distinct goods and services. Goods and services are distinct when the customer can benefit from them on their own and the promises to transfer these items are separately identifiable from other promises within the contract. When the Company is contracted to provide a single promise (an integrated system), it is treated as a single performance obligation as goods and services are provided with the same pattern of transfer. The Company has identified the provision of the technology sublicense combined with the use of the REF Facility to be a single performance obligation.

REF Facility revenues are recognized based upon the type of contract with the TP Investor. Generally, the Company has three types of contracts with customers (a) Leases, (b) Member Interest Purchase Agreements ("MIPAs") and (c) Asset Purchase Agreements ("APAs"). In all instances the contracts relate to the use of the REF Facility and the related sublicensed patented technology which is necessary for each Producer Entity to produce REF utilizing the REF Facility.

Depending upon the agreement, the Company may receive fixed payments or a combination of fixed and variable payments over the contract term. Variable payments are determined based upon the expected amount of REF production during the defined period. Certain prepayments are received upon execution of TP Investor agreements. Significant judgments and estimates are used in the Company's revenue policies. Throughout the revenue cycle, the Company evaluates contractual evidence, monitors performance and evaluates variable consideration changes.

For the Leases and MIPAs, revenue is recognized "over time" using the output method, utilizing actual REF production volumes. In these agreements where a prepayment is received, that amount is recorded as deferred revenue and is amortized

TINUUM GROUP, LLC AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
DECEMBER 31, 2021 and 2020
(in thousands)

into revenue in accordance with the amortization period of the respective TP Investor agreement. Contingent consideration associated with Leases or MIPAs is recorded based upon actual REF production volumes achieved, constrained by any contractual limitations or by production volumes that management estimates could occur.

Revenues recorded related to the APAs are recorded when the Company has completed delivery of the REF Facility and has transferred title and control of the REF Facility to the TP Investor. These revenues are recognized at a “point-in-time” based upon the net present value of the expected fixed purchase payments plus management’s estimate of any variable payments associated with the sale. Additionally, since the payments are made quarterly over a time period exceeding one year, a financing component exists to these transactions. For the years ended December 31, 2021 and 2020, interest recorded related to these contracts was \$541 and \$1,619, respectively, and is recorded as interest income in the statement of operations.

As a result of the recording of APA revenues as of a point-in-time, future cash flows will be received according to the contractual payment schedules, but no future revenues, other than changes in estimates, will be recognized for these contracts. Changes in estimates for variable consideration can occur for a variety of reasons, including but not limited to (i) annual inflation adjustment factors being different from what was originally estimated and (ii) changes in actual versus expected production volumes of REF. For the years ended December 31, 2021 and 2020, the impact of the change in estimate resulted in a decrease in revenues of \$2,643 and \$1,129, respectively.

Generally, the REF Facility is collateral for the outstanding contract receivable balances recorded by Tinum.

The Company recognizes a contract receivable when the Company transfers control of a REF Facility to the customer in advance of receiving consideration. Contracts with variable consideration are billed quarterly in arrears, once production volumes are known, under similar payment terms.

Reduced Emissions and Unrefined Fuel

The Company’s consolidated VIEs, which are Producer Entities, purchase and take title to feedstock fuel under purchase agreements with each respective Generator or other supplier of feedstock fuel. Each Producer Entity purchases chemicals from third-party vendors and applies them to the feedstock fuel to produce REF utilizing the REF Facility. The REF is sold by the Producer Entities, under REF sale agreements, to a Generator or to another third party at the discretion of the manager of each Producer Entity, as permitted under the applicable Generator agreements. The Company performs REF recertification or redetermination testing periodically as required by Section 45 with respect to production and sale of REF at each of its REF Facilities. During the years ended December 31, 2021 and 2020, each of the Producer Entities sold all of its REF and unrefined fuel (coal untreated but part of the REF process) to third parties that used the fuel to generate electricity and recorded such amounts as reduced emissions and unrefined fuel revenues.

Each VIE utilizes the combination of the REF Facility and the technology license to combine raw materials (feedstock coal and chemicals) to produce REF which is then sold as a separate manufactured product to its customer, the Generator. As a result, the Company recognizes both REF Facility revenues and reduced emissions and unrefined fuel on a gross basis.

An accounts receivable balance represents the Company’s right to consideration that is unconditional and only the passage of time is required before payment of that consideration is due. No allowance for doubtful accounts related to accounts receivable balances or impairment of contract receivables has been recorded as of December 31, 2021 and 2020.

Deferred revenue is recognized when the Company receives consideration in advance of performance.

The Company disaggregates revenue based upon the revenue recognition methodology (over time vs. point-in-time).

Taxes assessed by a governmental agency that are imposed on and concurrent with a specific revenue producing transaction collected by the Company from a customer are excluded from revenues.

Shipping and handling costs are not associated with Tinum’s products and services and therefore are not included in revenues or costs of revenues. No amounts have been recorded for returns, refunds, or other similar obligations.

Income Taxes

The Company, with the consent of its Members, has elected to be taxed under applicable sections of federal and state income tax laws as a limited liability company treated as a partnership for income tax purposes. As a result of this election, no federal income taxes are incurred by the Company. Instead, the Members are liable for income taxes on their pro rata share of the Company’s income, deductions, losses, and credits. In certain states, the Company is taxed based upon shareholder equity or other enterprise considerations. In these instances, the Company records and pays the applicable tax directly to the state agency.

TINUUM GROUP, LLC AND SUBSIDIARIES
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(in thousands)

One of the Company's consolidated VIEs has elected to be a C corporation for federal and state income tax purposes. As a result, that VIE's income tax provision and related deferred tax assets and liabilities are included within the consolidated financial statements.

Deferred income taxes are provided for temporary differences arising from differences between the financial statement amount and tax basis of assets and liabilities existing at each balance sheet date, using enacted tax rates anticipated to be in effect when the related taxes are expected to be paid. A valuation allowance is established if it is more likely than not that a deferred tax asset will not be realized. The Company includes interest and penalties related to state tax as a component of income tax expense.

The Company applies the requirement of ASC 740, *Income Taxes*, related to accounting for uncertain tax positions.

In January 2021, the Company was notified that one of its consolidating VIEs was selected for audit by the IRS. Tinuum is the partnership representative and cooperated with the IRS audit requirements. The audit was completed by the IRS during 2021 with no proposed adjustments.

Recent Accounting Pronouncements

The Company does not believe that there are any new accounting pronouncements that have been issued that might have a material impact on its financial position or results of operations.

NOTE 2 - FIXED ASSETS

Reduced Emissions Fuel Facilities

Each of the REF Facilities and related components that were placed in service by the Company demonstrated the qualified emissions reductions to qualify for PTCs. REF Facilities are stated at historical cost. Depreciation is calculated using the straight-line method over a 10 year period, commencing with the original placed in service date. All REF Facilities were fully depreciated as of December 31, 2021.

Furniture, Fixtures and Equipment

Furniture, fixtures, and equipment is comprised of office furniture, fixtures and office equipment, including those under finance leases. These assets are recorded at cost and depreciated using the straight-line method with estimated useful lives ranging from 3 to 8 years.

The following table summarizes the components of gross and net carrying amounts for fixed assets as of December 31, 2021 and 2020:

	<u>2021</u>	<u>2020</u>
REF Facilities and related equipment	\$ 73,649	\$ 91,399
Assets associated with removal obligations	1,059	1,637
Furniture, fixtures, equipment and other	1,369	1,397
ROU assets	703	711
Accumulated depreciation	(75,956)	(67,668)
Impairment reserve	(604)	(2,968)
Fixed assets, net	<u>\$ 220</u>	<u>\$ 24,508</u>

Depreciation expense was \$24,101 and \$28,175, for the years ended December 31, 2021 and 2020, respectively.

During 2021 the Company reevaluated certain REF Facility equipment for which an impairment reserve had been recognized in 2020. Certain REF Facility equipment was either disposed of or sold, resulting in an adjustment to the impairment reserve.

Under the site license agreements between the Producer Entities or Tinuum and the Generators, Tinuum may be required to return the Site upon which the REF Facility is located to its original condition at the end of the applicable contract period. In instances where the applicable agreements place this responsibility on the Company, the Company has recorded a liability for an ARO equal to the fair value of the estimated cost to retire the REF Facility and return each Site to its original condition. The ARO liability was estimated by the Company using estimated and historical facility removal costs and anticipated future inflation rates. This estimated future value was discounted to its present value using the Company's credit-adjusted risk-free

TINUUM GROUP, LLC AND SUBSIDIARIES
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(in thousands)

rate. The carrying value of the asset is depreciated on a straight-line basis over the remaining estimated life of the REF Facility asset group. The ARO liability is increased over time to reflect the change in its present value, and the capitalized cost is depreciated over the useful life of the site license. In subsequent periods, the Company is required to make adjustments to AROs based on changes in the estimated fair values of the obligations. Corresponding increases in asset book values are depreciated over the remaining useful life of the related site license. Uncertainties as to the probability, timing, or amount of cash flows associated with AROs may affect management's estimates of fair value. For the years ended December 31, 2021 and 2020, within operating expenses, the Company recorded \$399 and \$184 of accretion expense, respectively.

The following table describes changes to the Company's ARO liability for the years ended December 31, 2021 and 2020:

	2021	2020
Beginning balance	\$ 2,070	\$ 1,449
Liabilities incurred, net	—	631
Gain on removal of liability	(131)	(194)
Accretion	399	184
Settlement of obligations	(543)	—
Ending balance	<u>\$ 1,795</u>	<u>\$ 2,070</u>

NOTE 3 - INVENTORY

Inventory is comprised primarily of feedstock fuel and chemicals used in the production and sale of REF at REF Facilities. The Company assesses the inventory valuation on a monthly basis and reduces the value for any obsolete inventory. No valuation allowance was considered necessary as of December 31, 2021 and 2020.

	2021	2020
Feedstock fuel	\$ —	\$ 12,707
Chemicals	—	1,023
Total inventory	<u>\$ —</u>	<u>\$ 13,730</u>

NOTE 4 - REVENUES

As discussed in Note 1, revenue is recognized when a performance obligation is satisfied. The Company's contracts can contain both fixed and variable components of the transaction price. Each contract is evaluated for these components and may be determined to include fixed consideration, variable consideration and financing components as part of the overall transaction price. The Company receives payments from customers based upon specific payment schedules established under each contract. Payment schedules can include a combination of prepayments, fixed payments and variable payments, based upon expected production volumes, and are generally made quarterly.

When a contract is determined to contain variable consideration, the transaction price is estimated using the expected value (i.e., the most likely amount method) to predict revenue for that contract. These variable amounts are estimated at contract inception based upon the projected REF production volumes associated with the specific Generator location. Estimated amounts are included in the transaction price to the extent it is probable that a significant reversal of cumulative revenue recognized will not occur when the uncertainty associated with the variable consideration is resolved. Estimates of variable consideration are estimated based upon contractual terms, historical experience and projected REF production volumes.

Nine REF Facility transactions with TP Investors are transactions with a related party as of December 31, 2021 and 2020. These transactions generally have terms that extend to the date ten years after the placed in service date for the particular REF Facility, subject to earlier termination by the TP Investor at periodic intervals or upon the occurrence of specified events. As of December 31, 2021 all transactions with a related party TP Investor had been terminated.

Under the various TP Investor agreements, Tinuum has committed to provide the REF Facility and the related sublicense for a term as identified in each contract. Most of the agreements expired in 2021 or will expire by the first quarter of 2022. Generally, payments are made quarterly to Tinuum on a net 10 to 30 days basis, in advance of the respective quarter.

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Future REF Facility payments, including any eliminated in consolidation, are based on the 2021 levels of REF production and are \$9,753 for 2022.

In December 2019, the Company agreed to provide a future price concession to a significant customer. A portion of the price concession was provided via a note payable (“Customer Note”) under which the Company would make monthly principal and interest payments to the customer commencing in January 2020 and continuing through March 2021. The Customer Note was \$27,000 and the Company recorded the amount as contract costs on the consolidated balance sheet and allocated the payments to the customer as a reduction to the transaction price of the existing contracts with the customer. The reduction in the transaction price was recorded monthly, commencing with the contract date of December 2019 through the end of the term of the payments of March 31, 2021. The reduction in the transaction price is recorded as production volumes are achieved (over time). For the years ended December 31, 2021 and 2020, the Company reduced revenues under this price concession contract by \$5,226 and \$20,903, respectively.

In certain instances, the Company employs outside parties to facilitate the commencement of a Lease, MIPA or APA transaction. Under these agreements, the Company typically pays the outside party a fee (“Fee”) relative to either the collection of revenues by the Company or the REF production volumes achieved. Under the Lease and MIPA transactions, any related contract costs are recorded as the production volumes or collection of revenues are achieved. These amounts are recorded as a component of cost of goods sold. Under the APA agreements, the Fees are capitalized as contract costs based on the estimated revenues recognized at the commencement of the contract and are amortized as a reduction of revenue over the period of benefit. For the years ended December 31, 2021 and 2020, Fees included in contract costs on the consolidated balance sheet were \$0 and \$315, respectively.

NOTE 5 - VARIABLE INTEREST ENTITIES

For the years ended December 31, 2021 and 2020, the Company consolidates nine entities (the “TG VIEs”) that were created as REF production companies. The operations include the purchase of feedstock fuel from a Generator, application of chemicals utilizing that Producer Entity’s REF Facility, and the subsequent sale of REF to the Generator. In all nine of the TG VIEs, CCS-AE, LLC (“CCS-AE”), a subsidiary of the Company, or another Tinum entity is the manager (“Managing Member”) and holds a 0.2% or 1.0% member interest, depending on the transaction. As the Managing Member of the TG VIEs, CCS-AE or Tinum directs the activities that are considered most significant to the entities. Based upon the criteria set forth in ASC 810, the Company has determined that it is the primary beneficiary in the TG VIEs for the years ended December 31, 2021 and 2020. As such, the financial results of the TG VIEs are consolidated with the results of the Company, and the results attributable to the other owners are presented as noncontrolling interests within the consolidated financial statements.

Creditors of the TG VIEs have no recourse against the general credit of the Company (outside of its member interest or specific guarantee obligations) and the assets of the Company are not collateral for any TG VIE obligations. The operations of all nine entities are financed through capital calls of the respective members in proportion to their member interests. In the event that a member defaults on a capital call request made by the Managing Member, the Managing Member may (i) withhold distributions payable to the defaulting member or sue for the amount due, and/or (ii) elect to transfer the defaulting member’s interest to a separate legal entity controlled by the Managing Member, or (iii) suspend operations of the REF Facility. In certain instances, the TP Investor has the ability to put, and Tinum has the ability to call, the other member interests at a purchase price equal to fair market value.

Under the provisions of certain of the TG VIEs’ various agreements, including the leases of REF Facilities or the partnership operations of the TG VIEs, the agreements terminate during time periods ranging from the fourth quarter of 2021 through December 31, 2022, unless terminated earlier by written consent of the members.

Under certain of the TG VIE agreements, capital call limitations exist, limiting the amount of capital calls if certain operational costs are exceeded.

NOTE 6 - NOTES PAYABLE

Line of Credit

In September 2019, the 2013 Revolver (“Revolver”) with BOK Financial (“BOK”), was amended and replaced with the Fifth Amendment to the Revolver (“Fifth Amendment”). The Fifth Amendment expired on December 31, 2020 and was not renewed and all balances were fully repaid. Under the Fifth Amendment, prior to expiration, the available borrowing limit was:

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	Available Borrowing Limit
For the period ending December 30, 2019 through September 29, 2020	\$ 7,000
For the period commencing September 30, 2020 through December 30, 2020	\$ 3,400
For the period after December 31, 2020	\$ —

The Fifth Amendment required any outstanding borrowings to be fully repaid for a period of fifteen consecutive days during two non-consecutive calendar quarters.

Amounts outstanding under the Fifth Amendment were repaid at the option of the Company. Any undrawn balance during the years ended December 31, 2020, was subject to a quarterly unused facility fee in the amount of 0.826% annually. Interest on outstanding balances was payable monthly and was accrued at the greater of 5.5% per annum or the prime rate (as defined in the agreement) plus 1.0%.

The Fifth Amendment was collateralized by the assets of the Company and the equity interests and proceeds related to such equity interests of each material subsidiary owned by the Company. The Fifth Amendment was also collateralized by the Company's deposit accounts held at BOK. These accounts were not restricted by the Fifth Amendment.

Customer Note

As mentioned in Note 4, in December 2019, the Company agreed to provide a future price concession to a significant customer via a Customer Note. The Company made monthly principal and interest payments to the customer. Payments commenced in January 2020 and extended through March 2021, when the Customer Note was fully repaid. As of December 31, 2020, the Customer Note balance was \$5,400. The Customer Note bears interest at 8% per annum.

Under the Customer Note, Tinum has agreed to maintain a Cash Reserve Account of \$3,000, to limit additional indebtedness to \$7,000 (plus amounts to finance Company insurance premiums plus a maximum of \$500 for finance leases) and to maintain compliance with certain loan covenants. At December 31, 2020, the Company was in compliance with the Customer Note covenants.

Secured Promissory Note

In February 2014, a VIE consolidated into the consolidated financial statements of the Company, entered into an \$11,000 secured promissory note (the "Note") with a Generator from which it purchases feedstock fuel, and to which it sells reduced emissions and unrefined fuel on a monthly basis. The purpose of the Note is to finance the purchases of feedstock fuel from the Generator. The amount of principal and interest owed is dependent upon the amount of feedstock fuel purchased and reduced emissions and unrefined fuel sold between the two parties and is net settled on a monthly basis. The Note was collateralized by the feedstock fuel inventory.

The Note bears interest at a per annum rate equal to the short-term applicable federal rate announced by the IRS in December of each year. The interest rate for the years ended December 31, 2021 and 2020 was 0.14% and 1.60% per annum, respectively. Interest is payable quarterly in arrears.

All outstanding amounts owed under the Note are due and payable on the earlier of December 31, 2021 or the termination or expiration of the Feedstock Coal Purchase Agreement between the TG VIE and the Generator. The Note was fully repaid as of December 31, 2021.

As of December 31, 2021 and 2020, respectively, the outstanding balance on the Note was \$0 and \$4,327 with interest payable of \$0 and \$16, respectively.

In June 2018, a second VIE consolidated into the consolidated financial statements of the Company, entered into an \$1,986 secured promissory note ("2018 Note") with a Generator to fund the initial purchase of feedstock fuel. The 2018 Note bears interest at a per annum rate equal to the mid-term applicable federal rate announced by the IRS in December of each year. The rate was 0.48% and 1.67% for the years ended December 31, 2021 and 2020, respectively. Interest is payable quarterly in arrears. The 2018 Note is collateralized by the feedstock fuel inventory.

All outstanding amounts owed under the 2018 Note are due and payable on the earlier of December 31, 2025, or the termination or expiration of the Feedstock Coal Purchase Agreement between the Company and the Generator.

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As of December 31, 2021 and 2020, respectively, the outstanding balance on the Note was \$0 and \$1,986. Interest payable of \$1 and \$3 was recorded as of December 31, 2021 and 2020, respectively.

NOTE 7 - MEMBERS' EQUITY

Under the Class B Unit Purchase Agreement ("Class B Agreement") with GSFS, which was entered into upon the amendment and restatement of the Tinuum Operating Agreement in 2011, ADA and NexGen each entered into a limited guarantee agreement under which the parties are obligated to guarantee performance by Tinuum of its obligations to indemnify GSFS against certain losses it may suffer as a result of inaccuracies or breach in representations and covenants related to the Class B Agreement or REF Facilities' lease agreements with GSFS affiliates. ADA and NexGen entered into a contribution agreement where, in the event of such a breach, they have agreed to contribute their pro rata share of any amounts under the limited guarantee.

The Class B units were considered conditionally redeemable as specified in the Second Amended and Restated Operating Agreement and the Class B Agreement. Upon satisfaction of the redemption criteria in 2018, GSFS continues to own the Class B units which have no further capital call requirements and have limited voting rights. In September 2019, the Second Amended and Restated Operating Agreement was amended to eliminate the preferential redemption provisions for the Class B shares and simultaneously reallocated certain tax attributes between the Class A and B Members.

The Company had the following classes and percentages of Member units issued and outstanding at December 31, 2021 and 2020.

Class A Units (voting)	85 %
Class B Units (non-voting)	15 %

NOTE 8 - INCOME TAXES

During the years ended December 31, 2021 and 2020, the Company has concluded that there are no significant uncertain tax positions that would require recognition or disclosure in the financial statements. As of December 31, 2021 and 2020, the Company made no provision for interest or penalties related to uncertain positions.

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amounts of assets and liabilities for financial reporting purposes and the amounts for income tax purposes related to one of the Company's consolidated VIEs. Under a tax sharing agreement with the specific TP Investor of this VIE, the deferred tax assets are allocated specifically to the TP Investor and are not for the benefit of Tinuum or its members. On a quarterly basis, the TP Investor provides a cash payment to the VIE for the prior quarter's tax benefits generated, generally production tax credits and net operating losses. As a result, the quarterly estimated funding is presented as an income tax receivable in the consolidated balance sheets. As of December 31, 2021, an income tax payable is being presented as the estimated funding exceeded the actual TP investor provision.

The income tax payable as of December 31, 2021 is included in accrued liabilities in the consolidated balance sheets and consists of:

	2021
Net operating losses	\$ 28
Deferred tax liability	—
Production tax credits	—
TP Investor provision modification	(93)
Income tax payable	\$ (65)

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The income tax receivable as of December 31, 2020 consists of:

		2020
Net operating losses	\$	1,026
Deferred tax liability		(21)
Production tax credits		4,961
Income tax receivable	\$	5,966

Net operating loss carryforwards can be carried forward indefinitely and the PTCs can be carried forward for 20 years.

For the years ended December 31, 2021 and 2020, income tax expense (benefit) consisted of the following:

		2021		2020
Current	\$	1,061	\$	1,137
Deferred		(9,769)		(18,979)
Total income tax (benefit) expense	\$	(8,708)	\$	(17,842)

NOTE 9 - RELATED PARTY TRANSACTIONS

During 2021 and 2020, the Company incurred expenses and capital expenditures and had amounts payable (excluding capital distributions) to and revenues recognized from the following related party entities:

		ADA		TS		GSFS Affiliates		NexGen and Affiliates
		<i>(a)</i>		<i>(b)</i>		<i>(c)</i>		<i>(d)</i>
Accounts Receivable as of the Year Ended								
December 31, 2021	\$	102	\$	—	\$	—	\$	—
Accounts Payable as of the Year Ended								
December 31, 2021	\$	2,467	\$	4,154	\$	—	\$	15
December 31, 2020		3,454		4,179		—		20
Revenues Recognized During the Year Ended								
December 31, 2021	\$	—	\$	(2,230)	\$	85,672	\$	34
December 31, 2020		—		(593)		88,243		—
Expenses Incurred During the Year Ended								
December 31, 2021	\$	14,377	\$	18,668	\$	—	\$	240
December 31, 2020		13,656		16,629		—		527

(a) ADA expenses include expenditures for royalties and consulting services.

(b) TS expenses include operating expenses associated with the operations of REF Facilities. TS revenues include APA point in time revenue estimates and management fee revenues from TP Investors included within the TS consolidated financial statements.

(c) GSFS affiliates revenues relate to REF Facility lease revenues recognized.

(d) NexGen and affiliates expenses include management fees and labor costs.

The Company acquires substantial amounts of fixed assets from TS. For the years ended December 31, 2021 and 2020, the Company acquired \$0 and \$5,549, respectively, of capital assets from its related party, TS.

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For the year ended December 31, 2021, TS incurred, on the Company's behalf, proceeds related to the sale of fixed assets in the amount of \$250.

NOTE 10 - COMMITMENTS

Purchase Commitments

In November 2011, Tinum entered into a technology licensing agreement with ADA whereby Tinum agreed to pay ADA royalties based on a percentage of operating income from REF production at REF Facilities that utilize the M-45™ technology. During the years ended December 31, 2021 and 2020, respectively, the Company recognized royalty expense under cost of sales in the amounts of \$14,354 and \$13,440 respectively.

In December 2015 the Company was assigned, by TS, a Master Supply Agreement with a chemical vendor. Under the agreement the Company had a commitment commencing January 1, 2015, for minimum purchase quantities of the specified chemical that if not achieved would require a shortfall payment amount ("Shortfall") to be paid to the vendor on a monthly basis. Any Shortfall payment required would be applied to future chemical purchases once certain minimum volume levels were achieved. In 2018 an agreement was reached to further amend the Master Supply Agreement and the Company made an additional prepayment of \$8,187 resulting in a total prepaid amount of \$17,755 on deposit with the vendor as of December 31, 2019. Beginning in August 2020, the Company started utilizing the prepaid deposit balance through ongoing chemical usage. The prepaid deposit balance was fully utilized as of December 31, 2021 and therefore the balance was \$0 at December 31, 2021. As of December 31, 2020, the balance was \$10,632 and was included within other current assets in the Company's consolidated balance sheets.

Retention Compensation

It has been an ongoing practice of the Company to provide severance payments to employees that are involuntarily terminated for reasons other than for cause. In anticipation of the wind down of operations expected by 2022, the Company has formalized that practice into a retention compensation program. The purpose of the program is to incent employees to remain with the Company through the wind down dates necessary for the successful cessation of the Company. Certain executive employees have contracts that do not have a defined retention date but provide for severance payment provisions equivalent to one year of base salary that only become due and payable upon a decision by the Board of Managers to terminate an executive other than for cause. The potential estimated liability under these contracts is approximately \$750. All non-executive employees have a retention bonus agreement with a defined dollar amount that is payable by the Company upon the earlier of the Company's initiation of an involuntary termination or the employee remaining with the Company until the defined retention date within their agreement. Any employees electing to voluntarily terminate employment with the Company prior to their defined retention date will forfeit their retention bonus amount. Compensation expense of \$3,116 and \$2,048 was recognized for the years ended December 31, 2021 and 2020, respectively. A remaining liability of \$3,613 is recorded and of this amount \$1,835 is included in other current liabilities for TG employees and \$1,778 is in the related party payables related to TS employees with retention dates in 2022.

401k Profit Sharing Plan and Other Benefits

The Company offers a defined contribution and profit sharing plan (the "Plan") to employees who are over 18 years of age and have been employed by the Company for more than 30 days. Employees can deposit up to 80% of their eligible pay up to the statutory limit in the Plan. The Company contributes 3% of employees' eligible pay to the Plan as safe harbor contributions and an additional matching contribution equivalent to 50% of the first 6% of employee contributions. Company contributions charged to benefits expense was \$157 and \$194 for the years ended December 31, 2021 and 2020, respectively.

As of January 24, 2022, the Company has initiated the termination of the Plan. Accordingly, employees will be required to roll over their balances under the termination provisions stipulated by the Plan.

Office Lease

Tinum's ROU asset and lease liability are comprised of its lease for its corporate office space. The lease has an eight-year term that commenced in March 2014. The lease does not include renewal options that the Company expects to utilize. The Company has utilized its implicit borrowing rate of 5.75% to calculate the ROU asset and lease liabilities. Operating lease expense for each of the years ended December 31, 2021 and 2020 was \$197 and \$199 respectively. Operating leases are included in the ROU assets within fixed assets, net, and lease liabilities are included within accrued liabilities on the consolidated balance

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sheets. Real estate taxes and common area maintenance charges are expensed as incurred as operating expenses and are not included in the lease payments.

As of December 31, 2021, future annual lease payments under lease agreements through December 31, 2022 are \$233 less \$7 of interest expense, reflecting a present value of lease liabilities of \$226.

NOTE 11 - CONCENTRATIONS

The Company's operations were dependent upon TP Investors leasing or purchasing REF Facilities. Further, under the terms of the various TP Investor agreements, the agreements were subject to termination or modification by the TP Investor at periodic intervals or upon the occurrence of specified events which included amendments to Section 45 of the Internal Revenue Code. The termination or modification of all or a material portion of any TP Investor agreements would have had a significant adverse impact on the Company's future operations and financial condition.

Additionally, the production and sale of REF was dependent upon the plant operations of specific generating stations where the REF Facilities were located. Production at these locations could have been impacted by the demand for electricity, the amount of fuel burned by the utility to produce electricity, disruptions due to foreseen or unforeseen plant outages, or changes in government regulations related to electricity generation or coal burning activities.

Certain of the chemicals utilized by the Company to produce REF were available from a limited number of vendors in the United States. The Company's operations could have been materially and adversely affected if the Company encountered difficulty procuring these chemicals, the quality of available chemicals deteriorated or there were significant price increases for the chemicals.

NOTE 12 - SUBSEQUENT EVENTS

Management evaluated subsequent events through March 4, 2022, the date financial statements were available to be issued.

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, Inc.
(Registrant)

By /s/ Greg P. Marken
Greg P. Marken
Chief Executive Officer (Principal Executive Officer)

Date: March 8, 2022

By /s/ Morgan Fields
Morgan Fields
Chief Accounting Officer (Principal Financial and Accounting Officer)

Date: March 8, 2022

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/ Carol Eicher
Carol Eicher, Director

Date: March 8, 2022

By /s/ Gilbert Li
Gilbert Li, Director

Date: March 8, 2022

By /s/ J. Taylor Simonton
J. Taylor Simonton, Director

Date: March 8, 2022

By /s/ L. Spencer Wells
L. Spencer Wells, Director

Date: March 8, 2022

Subsidiaries of Advanced Emissions Solutions, Inc.

Entity Name	State or Country of Organization
Advanced Emissions Solutions, Inc.	Delaware
ACS Land Company, LLC	Delaware
ADA Analytics, LLC	Delaware
ADA Analytics Israel Ltd.	Israel
ADA Carbon Solutions, LLC	Delaware
ADA Carbon Solutions (Operations), LLC	Delaware
ADA Carbon Solutions (Red River), LLC	Delaware
ADA Carbon Solutions (Vortex IP), LLC	Delaware
ADA Carbon Solutions (Vortex Operations), LLC	Delaware
ADA-ES, Inc.	Colorado
ADEquity, LLC	Delaware
CarbPure Technologies, LLC	Delaware
Crowfoot Supply Company, LLC	Delaware
Five Forks Mining, LLC	Delaware
FluxSorb Technologies, LLC	Delaware
Marshall Mine, LLC	Delaware

Each subsidiary does business under its chartered name.

Consent of Independent Registered Public Accounting Firm

We consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-143004, No. 333-144820, No. 333-219054, No. 333-121234, No. 333-110479, No. 333-159715, No. 333-164792, No. 333-184772, and No. 333-189351) of Advanced Emissions Solutions, Inc. of our report dated March 8, 2022, relating to the consolidated financial statements of Advanced Emissions Solutions, Inc. and subsidiaries, appearing in this Annual Report on Form 10-K of Advanced Emissions Solutions, Inc. for the year ended December 31, 2021.

/s/ Moss Adams LLP

Denver, Colorado
March 8, 2022

CONSENT OF INDEPENDENT AUDITORS

The Members
ADA-ES, Inc.
NexGen Refined Coal, LLC
GSFS Investments I Corp; and

The Board of Managers
Tinum Group, LLC

We consent to the incorporation by reference in the Registration Statements on Form S-8 (No. 333-143004, No. 333-144820, No. 333-219054, No. 333-121234, No. 333-110479, No. 333-159715, No. 333-164792, No. 333-184772, and No. 333-189351) of our report dated March 4, 2022, relating to the consolidated financial statements of Tinum Group, LLC (which report expresses an unqualified opinion and includes an emphasis of matter paragraph regarding going concern) attached to this Annual Report on Form 10-K of Advanced Emissions Solutions, Inc. for the year ended December 31, 2021.

/s/ Moss Adams LLP

Denver, Colorado
March 4, 2022

CERTIFICATION

I, Greg P. Marken, certify that:

1. I have reviewed this Annual Report on Form 10-K of Advanced Emissions Solutions, 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, 2022

/s/ Greg P. Marken

Greg P. Marken
Chief Executive Officer
(Principal Executive Officer)

CERTIFICATION

I, Morgan Fields, certify that:

1. I have reviewed this Annual Report on Form 10-K of Advanced Emissions Solutions, 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, 2022

/s/ Morgan Fields

Morgan Fields

Chief Accounting Officer

(Principal Financial and Accounting Officer)

**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, Inc. (the "Company") for the year ended December 31, 2021, as filed with the Securities and Exchange Commission on the date hereof (the "Report"), Greg P. Marken, as Principal Executive Officer of the Company, and Morgan Fields, 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:

1. 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
2. The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of Advanced Emissions Solutions, Inc.

/s/ Greg P. Marken

Greg P. Marken
Chief Executive Officer
Date: March 8, 2022

/s/ Morgan Fields

Morgan Fields
Chief Accounting Officer
Date: March 8, 2022

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.

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, 2021, 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, 2021 were taken from the MSHA system as of March 4, 2022.

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 mine that is located in the Gulf Coast Lignite Region, in Natchitoches Parish, Louisiana ("Five Forks Mine"). For the year ended December 31, 2021, there were no citations or orders issued to the Five Forks Mine. We also own a mine located in the Gulf Coast Lignite Region, in Harrison and Panola Counties, Texas ("Marshall Mine"). For the year ended December 31, 2021, there were no citations or orders issued to the Marshall Mine.

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, 2021, there were no pending or legal actions before the Commission at the Five Forks Mine. Further, for the year ended December 31, 2021, there were no pending or legal actions before the Commission at the Marshall Mine.