Aegion Corp
Form 10-K
March 01, 2019

UNITED STATES SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549
FORM 10-K
x ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the fiscal year ended December 31, 2018
or
.. TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934

For the transition period from to
Commission File Number: 001-35328
Aegion Corporation
(Exact name of registrant as specified in its charter)

Delaware	45-3117900
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
17988 Edison Avenue, Chesterfield, Missouri	63005-1195
(Address of principal executive offices)	(Zip Code)

Registrant's telephone number, including area code: (636) 530-8000
Securities registered pursuant to Section 12(b) of the Act:

Title of each class	Name of each exchange on which registered
Class A Common Shares, $.01 par value	The Nasdaq Global Select Market

Securities registered pursuant to 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 x
Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 of 15(d) of the Act. Yes ¨ No x
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 x No ¨
Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes x No ¨
Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K(§229.405 of this chapter) 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, smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	Accelerated filer	Non-accelerated filer	Smaller reporting company	Emerging growth company
x	¨	¨	¨	¨

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 checkmark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ¨ No x

State the aggregate market value of the voting and non-voting common equity held by non-affiliates computed by reference to the price at which the common equity was last sold, or the average bid and asked price of such common equity, as of June 30, 2018: $831,818,679.

There were 31,781,352 shares of Class A common stock, $.01 par value per share, outstanding at February 25, 2019.

DOCUMENTS INCORPORATED BY REFERENCE

As provided herein, portions of the documents below are incorporated by reference:

Document	Part — Form 10-K
Registrant’s Proxy Statement for the 2019 Annual Meeting of Stockholders	Part III

TABLE OF CONTENTS

Note About Forward-Looking Information
The Private Securities Litigation Reform Act of 1995 provides a "safe harbor" for forward-looking statements. We make forward-looking statements in this Annual Report on Form 10-K for the year ended December 31, 2018 (this "Report") that represent our beliefs or expectations about future events or financial performance. These forward-looking statements are based on information currently available to us and on management's beliefs, assumptions, estimates and projections and are not guarantees of future events or results. When used in this report, the words "anticipate," "estimate," "believe," "plan," "intend," "may," "will" and similar expressions are intended to identify forward-looking statements, but are not the exclusive means of identifying such statements. Such statements are subject to known and unknown risks, uncertainties and assumptions, including those referred to in the "Risk Factors" section of this Report. In light of these risks, uncertainties and assumptions, the forward-looking events discussed may not occur. In addition, our actual results may vary materially from those anticipated, estimated, suggested or projected. Except as required by law, we do not assume a duty to update forward-looking statements, whether as a result of new information, future events or otherwise. Investors should, however, review additional disclosures made by us from time to time in our filings with the Securities and Exchange Commission. Please use caution and do not place reliance on forward-looking statements. All forward-looking statements made by us in this Report are qualified by these cautionary statements.

PART I

Item 1. Business
Unless otherwise indicated, the terms "Aegion Corporation," "Aegion," "the Company," "we," "our" and "us" are used in this Report to refer to Aegion Corporation or one of our consolidated subsidiaries or to all of them taken as a whole. We are incorporated in the State of Delaware. We maintain executive offices at 17988 Edison Avenue, Chesterfield, Missouri 63005. Our telephone number is (636) 530-8000 or toll free at (800) 325-1159. Our website address is www.aegion.com. Our common shares, $.01 par value, are traded on The Nasdaq Global Select Market under the symbol "AEGN". Our fiscal year ends on December 31 of each calendar year.

Overview
Aegion combines innovative technologies with market leading expertise to maintain, rehabilitate and strengthen pipelines and other infrastructure around the world. Since 1971, we have played a pioneering role in finding transformational solutions to rehabilitate aging infrastructure, primarily pipelines in the wastewater, water, energy, mining and refining industries. We also maintain the efficient operation of refineries and other industrial facilities and provide innovative solutions for the strengthening and increased longevity of buildings, bridges and other structures. We are committed to Stronger. Safer. Infrastructure®. We believe the depth and breadth of our products and services make us a leading provider for the world's infrastructure rehabilitation and protection needs.
Our Company premise is to use technology to extend the structural design life and maintain, if not improve, the performance of infrastructure, mostly pipelines and piping systems. We have proved this expertise can be applied in a variety of markets to protect pipelines in oil, gas, nuclear, power, utility, mining, wastewater and water applications and can be extended to the rehabilitation and maintenance of commercial structures and the provision of professional services in energy-related industries. Many types of infrastructure must be protected from the corrosive and abrasive materials that pass through or near them. Our expertise in non-disruptive corrosion engineering and abrasion protection is wide-ranging. We have a long history of product development and intellectual property management. We manufacture many of the engineered solutions we offer to customers as well as the specialized equipment required to install them. Finally, decades of experience give us an advantage in understanding municipal, utility, energy, mining, industrial and commercial customers. Strong customer relationships and brand recognition allow us to support the expansion of existing and innovative technologies in our core end markets.
We originally incorporated in Delaware in 1980 to act as the exclusive United States licensee of the Insituform® cured-in-place pipe ("CIPP") process, which Insituform's founder invented in 1971. The Insituform® CIPP process served as the first trenchless technology for rehabilitating wastewater pipelines and has enabled municipalities and private industry to avoid the extraordinary expense and extreme disruption that can result from conventional

“dig-and-replace” methods. We have maintained our leadership position in the CIPP market from manufacturing to technological innovations and market share for over 45 years.
We embarked on a diversification strategy in 2009 to expand not only our geographic reach but also our product and service portfolio into the oil and gas markets. Through a series of strategic initiatives and key acquisitions, we now possess a broad portfolio of cost-effective solutions for rehabilitating and maintaining aging or deteriorating infrastructure, protecting new infrastructure from corrosion and other threats, and providing integrated professional services in engineering, procurement, construction, maintenance and turnaround services for oil and natural gas companies, primarily in the midstream and

downstream markets. Today, our long-term strategy is to invest in our core end markets for organic growth and acquire innovative technologies to enhance our competitive position.

Our Segments

We have three operating segments, which are also our reportable segments: Infrastructure Solutions, Corrosion Protection and Energy Services. Our operating segments correspond to our management organizational structure. Each operating segment has leadership that reports to our chief executive officer, who is also the chief operating decision manager ("CODM"). The operating results and financial information reported by each of the segments are evaluated separately, reviewed regularly and used by the CODM to evaluate segment performance, allocate resources and determine management incentive compensation. See Note 14 to the consolidated financial statements contained in this Report for further discussion regarding our segments.

Infrastructure Solutions – The majority of our work is performed in the municipal water and wastewater pipeline sector and, while the pace of growth is primarily driven by government funding and spending, overall demand due to required infrastructure improvements in our core markets should result in a long-term stable growth opportunity for our market leading products, Insituform® CIPP, the Tyfo® system and Fusible PVC® pipe.

Corrosion Protection – Corrosion Protection is positioned to capture the benefits of continued oil and natural gas pipeline infrastructure developments across North America and internationally, as producers and midstream pipeline companies transport their product from onshore and offshore oil and gas fields to regional demand centers. The segment has a broad portfolio of technologies, products and services to protect, maintain, rehabilitate, assess and monitor pipelines from the effects of corrosion, including cathodic protection, interior pipe linings, interior and exterior pipe coatings and inspection and repair capabilities, as well as an increasing offering of data management capabilities related to these services. We provide solutions to customers to enhance the safety, environmental integrity, reliability and compliance of their pipelines in the global transmission and distribution network, especially in the oil and gas markets.

Energy Services – We offer a unique value proposition based on our world-class safety and labor productivity programs, which allow us to provide cost-effective construction, maintenance, turnaround and specialty services at customers' refineries as well as chemical and other industrial facilities. We understand the demands and the level of critical planning required to ensure a successful turnaround or shutdown and offer a full range of services as part of our facility maintenance solutions, while maintaining a reputation for being safe, professional and providing predictable value.

Our Long-Term Strategy

We are committed to being a valued partner to our customers, with a constant focus on expanding those relationships by solving complex infrastructure problems, enhancing our capabilities and improving execution while also developing or acquiring innovative technologies and comprehensive services. We are pursuing three key strategic initiatives:

Municipal Pipeline Rehabilitation – The fundamental driver in the global municipal pipeline rehabilitation market is the growing gap between the need and current spend. While we do not expect the spending gap to close any time soon, the increasing need for pipeline rehabilitation supports a long-term sustainable market for the technologies and services offered by our Infrastructure Solutions segment. We are committed to maintaining our market leadership position in the rehabilitation of wastewater pipelines in North America using our CIPP technology, the largest contributor to Aegion's consolidated revenues. We have a diverse portfolio of trenchless technologies to rehabilitate aging and damaged municipal pipelines. The focus today is growing our presence in the rehabilitation of pressure pipelines through both internal development and acquisitions. Our pressure pipe portfolio includes Fusible PVC®, InsituMain® CIPP, Tyfo® fiber-reinforce polymer ("FRP") and Tite Liner® high-density polyethylene ("HDPE") systems. Our international strategy is to use a blend of third-party product sales as well as CIPP and FRP contract installation operations in select markets. A key to the success of this strategy is a continuing focus on improving productivity to reduce costs and increase efficiencies across the entire value chain from engineering, manufacturing and installation of our technology-based solutions.

Pipeline Integrity and Corrosion Management – There are over one million miles of regulated pipelines in North America, which remain the safest and most cost-effective mode of oil and gas transmission. Within our Corrosion

Protection segment, the design and installation of cathodic protection systems to help prevent pipeline corrosion have historically represented a large portion of the revenues and profits for the segment. We also provide inspection services to monitor these systems and detect early signs of corrosion. In 2017, we launched a new asset integrity management program designed to increase the efficiency and accuracy of the pipeline corrosion assessment data we collect as well as upgrade how we share this valuable information with customers. Through this program, we seek to improve customer regulatory compliance and add new services in the areas of data gathering and validation, advanced analytics and predictive maintenance.

Downstream Oil Refining and Industrial Facility Maintenance – We have long-term relationships with oil refinery and industrial customers on the United States West Coast through our Energy Services segment. Our objective is to leverage those relationships to expand the services we provide in mechanical maintenance, electrical and instrumentation services, small capital construction, shutdown and turnaround maintenance activity and specialty services. We also continue to promote our safety and scaffolding services. There are opportunities in other industries on the West Coast such as oil and oil product terminals, chemicals, industrial gas and power to leverage our experience in maintenance and construction services. In addition, we are looking to expand our turnaround and specialty services beyond the West Coast.

Our Products and Services

Today our diverse portfolio of full service solutions includes:

Rehabilitation of Water and Wastewater Pipelines with CIPP Products – Through our Infrastructure Solutions segment, we offer manufacturing and installation of cost-effective solutions to remediate operational, health, regulatory and environmental problems resulting from aging and defective water and wastewater pipelines. Our Insituform® CIPP product is a trenchless, jointless, seamless pipe-within-a-pipe solution used to rehabilitate pipes in various diameters. Our Insituform® CIPP process provides a more affordable alternative to dig-and-replace methods and is a less disruptive and more environmentally friendly method for pipe repairs. We have maintained our leadership position in the CIPP market through our ISO 9001:2015 certified manufacturing facilities and technological innovations for over 45 years. Our Insituform® portfolio of products and services are utilized worldwide.

Fusible Polyvinyl Chloride Products for Rehabilitation and New Installation – Underground Solutions' patented Fusible PVC® pipe is used in the new installation and rehabilitation of pipelines for the water, wastewater, recycled water, industrial, power and oil and gas exploration upstream and midstream markets, primarily in North America. Underground Solutions uniquely complements Aegion's other pressure pipe rehabilitation technologies (InsituMain® CIPP as well as the Tyfo® and Tite Liner® systems) and increases Aegion's presence in the pressure pipe market.

Fiber Reinforced Polymer Systems for Rehabilitation and Strengthening – We use the Tyfo® system to rehabilitate medium- to large-diameter pipelines, providing a unique advantage over conventional rehabilitation methods. The Tyfo® system consists of proprietary and specialized carbon, glass, aramid and hybrid lightweight and low profile woven fabrics combined with the proprietary resin and epoxy polymers, which, in unique combinations, create the tested, proven and certified Tyfo® advanced composite system. The Tyfo® system is specifically engineered, manufactured and installed to solve a host of structural deficiencies or demands in existing structures. Certified Tyfo® system applicators apply the technology to civil structures to withstand seismic and force loads and provide strengthening, repair and restoration of masonry, concrete, steel and wooden infrastructure worldwide. We offer technical support to our customers through a highly-trained structural engineering team that assists in all phases of a potential project, from the initial design to implementation and installation. We believe there is a growing addressable market in North America as well as an increasing acceptance of our products and services internationally, with particular focus in Southeast Asia.

Cathodic Protection for Corrosion Engineering Control and Infrastructure Rehabilitation – Through our Corrosion Protection segment, we offer cathodic protection solutions, a time-tested pipeline corrosion mitigation technology that is mandated by regulatory rules in many types of pipeline systems. We provide engineering and inspection services through individuals trained and certified by the National Association of Corrosion Engineers International ("NACE"), which is one of the largest independent consulting corrosion engineering organizations in the world. We also provide project management, training, research, testing and design, consultation and installation services to the following markets: pipeline, refinery, above and underground storage tanks, water/wastewater structures, concrete infrastructure and offshore and marine structures. We also offer a full line of superior quality corrosion control and cathodic protection materials, which are NSF/ANSI 61 classified for drinking water system components. More recently, we have enhanced our pipeline inspection services through the internal development of an asset integrity management program, which is designed to digitize the critical pipeline data we gather and efficiently transmit, store and display the results to our customers.

Pipe Coatings for Corrosion and Thermal Control and Prevention – We provide products and services to protect pipes from corrosion primarily for the oil and gas industries. We accomplish this through external and internal pipe coatings utilizing fusion bonded epoxy (“FBE”) and field joint coating for corrosion protection of fittings, valves and other primary sources for metal corrosion. Additionally, we provide custom coating services on pipe bends, fittings, fabricated spools, valves and short runs of straight pipe for oil, gas and potable water services, as well as onshore or offshore fabrication and welding services. We also offer a proprietary robotic pipe coating and inspection technology for internal and external welded pipe field joints.

Thermoplastic Pipe Lining for Corrosion Control, Abrasion Protection and Pipeline Rehabilitation – Our proprietary Tite Liner® installation system provides chemical, corrosion and abrasion resistance for numerous pipeline applications, including in the oil and gas, mining and chemical pipeline markets, and has application in the rehabilitation of pressure pipes in the municipal marketplace. Our system can rehabilitate pipelines for a fraction of the cost and time associated with industrial pipeline replacement. We offer our lining protection products and services worldwide, with a strategic focus on expanding our presence in key end markets with sustainable capital spend on oil, gas and mining activities.

Our cathodic protection capabilities and products for lining and coating pipelines are applicable worldwide in the oil, gas and mining markets, with a focus on North America and the Middle East.

Construction and Maintenance of Oil and Gas Facilities – Through our Energy Services segment, which operates as Aegion Energy Services, we are a leading integrated service provider of maintenance, construction and turnaround activities for the downstream oil and gas markets. Focused on serving large refinery customers on the United States West Coast, but with recent or planned growth in Hawaii, Utah and the United States Rocky Mountain and Upper Midwest regions, Energy Services offers an industry-leading safety record, a strong reputation for reliability and quality and comprehensive solutions needed for major refinery maintenance, repairs and retrofits. These core competencies position Energy Services to meet the growing demand for non-discretionary operating and maintenance expenditures.

Strategic Initiatives and Key Divestitures

Restructuring Activities

2017 Restructuring

On July 28, 2017, our board of directors approved a realignment and restructuring plan (the “2017 Restructuring”). As part of the 2017 Restructuring, the Company announced plans to: (i) divest the Company’s pipe coating and insulation businesses in Louisiana, The Bayou Companies, LLC (“Bayou”) and Bayou Wasco Insulation, LLC (“BWI”); (ii) exit all non-pipe related contractor applications for the Tyfo® system in North America; (iii) right-size the cathodic protection services operation in Canada and the CIPP businesses in Australia and Denmark; and (iv) reduce corporate and other operating costs.

During 2018, the Company’s board of directors approved additional actions with respect to the 2017 Restructuring, which included the decisions to: (i) divest the Australia and Denmark CIPP businesses; (ii) take actions to further optimize operations within North America, including measures to reduce consolidated operating costs; and (iii) divest or otherwise exit multiple additional international businesses, including: (a) our cathodic protection installation activities in the Middle East, including Corrpower International Limited, our cathodic protection materials manufacturing and production joint venture in Saudi Arabia; (b) United Pipeline de Mexico S.A. de C.V., our Tite Liner® joint venture in Mexico; (c) our Tite Liner® businesses in Brazil and Argentina; (d) Aegion South Africa Proprietary Limited, our Tite Liner® and CIPP joint venture in the Republic of South Africa; and (e) our CIPP contract installation operations in England.

We divested our Bayou business in August 2018 and our Denmark CIPP business in November 2018. Discussions are underway with a prospective buyer for the sale of the Australia CIPP business. If discussions are successful, a transaction is expected to be completed during the first half of 2019. Planned divestitures or exits of the remaining international businesses noted above are expected to be substantially complete by June 30, 2019.

We expect the 2017 Restructuring to reduce consolidated annual expenses as well as eliminate significant losses over the last several years from underperforming businesses.

2016 Restructuring

On January 4, 2016, our board of directors approved a restructuring plan (the “2016 Restructuring”) to reduce our exposure to the upstream oil markets and to reduce consolidated expenses. During 2016, we completed the 2016 Restructuring, which: (i) reduced/eliminated Energy Services’ upstream operations in California and in the Permian Basin in Texas; (ii) reduced Corrosion Protection’s upstream exposure by divesting our interest in Bayou Perma-Pipe Canada, Ltd. (“BPPC”), our Canadian pipe coating joint venture; (iii) right-sized Corrosion Protection to compete more effectively; and (iv) reduced corporate and other operating costs.

See Notes 1 and 4 to the consolidated financial statements contained in this Report for a detailed discussion regarding strategic initiatives and restructuring efforts.

Divestitures – Planned and Completed

Through our restructuring efforts discussed above, we have divested, or have made the decision to divest, certain businesses in our Infrastructure Solutions and Corrosion Protection segments during 2018, 2017 and 2016:

i. On October 30, 2018, we executed a sale agreement for substantially all of the fixed assets and inventory from our CIPP operations in Denmark. In connection with the sale, we entered into a five-year exclusive tube-supply agreement whereby the buyers will exclusively purchase our Insituform® CIPP liners. The buyers will also be entitled to use the Insituform® trade name based on a trademark license granted for the same five-year time period.

ii. On August 31, 2018, we sold substantially all of the assets of Bayou and our ownership interest in Bayou Wasco Insulation LLC, which collectively had been held for sale as part of the 2017 Restructuring and reflected our desire to reduce further our exposure in the North American upstream oil and gas markets.

iii. On May 14, 2018, our board of directors approved plans to divest the assets and liabilities of our CIPP operations in Australia. While restructuring actions in Australia led to year-over-year improvements in operating results in 2018, an assessment of the long-term fit within Aegion's portfolio led to the decision to divest the business. A sales process is under way and management expects that a sale will occur in the first half of 2019.

iv. In February 2016, we sold our fifty-one percent (51%) interest in BPPC to our joint venture partner, Perma-Pipe, Inc. BPPC served as our pipe coating and insulation operation in Canada. The sale of our interest in BPPC was part of a broader effort to reduce our exposure in the North American upstream market.

v. During the first quarter of 2019, we entered into discussions with prospective buyers regarding the sale of our interests in Corrpower International Limited and Aegion South Africa Proprietary Limited. If the discussions are successful, we expect to close the transactions in the first half of 2019.

See Note 1 to the consolidated financial statements contained in this Report for a detailed discussion regarding strategic initiatives and divestitures.

Available Information

Our website is www.aegion.com. We make available on this website (under "Investors" and then under "SEC Filings"), free of charge, our proxy statements used in conjunction with stockholder meetings, annual reports on Form 10-K, quarterly reports on Form 10-Q, current reports on Form 8-K and Section 16 beneficial ownership reports (as well as any amendments to those reports) as soon as reasonably practicable after we electronically file such material with, or furnish it to, the Securities and Exchange Commission. In addition, our Code of Ethics for our Chief Executive Officer, Chief Financial Officer and senior financial employees, our Code of Conduct applicable to all of our officers, directors and employees, our Corporate Governance Guidelines and our Board committee charters are available, free of charge, on our website (under "Investors" and then under "Corporate Governance"). In addition, paper copies of these documents will be furnished to any stockholder, upon request, free of charge.

Technologies

Infrastructure Solutions

Our Insituform® CIPP process (including Insitupipe® and Insitutube®) for the rehabilitation of wastewater pipelines and other conduits utilizes a custom-manufactured tube, or liner, made of synthetic fiber. After the tube is saturated (impregnated) with a thermosetting resin mixture, it is installed in the host pipe by various processes. The resin is then cured, by heat (hot water or steam) or ultraviolet light, forming a new rigid pipe within a pipe.

Our iPlus® Infusion® pull-in CIPP is a trenchless method for the rehabilitation of small-diameter wastewater pipelines, whereby a felt liner is continuously impregnated with liquid, thermosetting resin through a proprietary process, after which the liner is pulled into the host pipe, inflated with air and cured with steam or ultraviolet light.

Our iPlus® Composite CIPP is used for the trenchless rehabilitation of large-diameter wastewater pipelines, where the felt liner is reinforced with carbon or glass fiber, impregnated with liquid, thermosetting resin, inverted into place and cured with hot water or steam.

Our InsituMain® CIPP system is a solution for pressure pipes, including water mains and force mains up to 96-inches in diameter. The system can negotiate bends and is pressure-rated up to 150 psi. The InsituMain® system has also been certified as complying with NSF/ANSI Standard 61.

Our Insituform® RPP™ process is a trenchless technology used for the rehabilitation of wastewater force mains and industrial pressure pipelines. The felt tube is reinforced with glass and impregnated with liquid, thermosetting resin, after which it is inverted with water and cured with hot water to form a structural, jointless pipe within the host pipe.

Our Insituform® PPL® process is a trenchless technology certified to NSF/ANSI Standard 61 used for the rehabilitation of drinking water and industrial pressure pipelines. A glass-reinforced liner is impregnated with an epoxy or vinyl ester resin, inverted with water and cured with hot water to form a jointless pipe lining within the host pipe.

Our iPlus® Glass UV system is a CIPP solution for small- to medium-diameter pipes utilizing a glass fiber tube that is impregnated with a resin sensitive to ultraviolet light. The tube is pulled into place in the host pipe, inflated by air and cured via an ultraviolet light source.

Sliplining is a method used to push or pull a new pipeline into an old one. With segmented sliplining, short segments of pipe are joined to form the new pipe. For gravity wastewater rehabilitation, these short segments can often be joined in a manhole or access structure, eliminating the need for a large pulling pit.

Our iTap® is an internal service line reinstatement process that includes associated fittings, robotics and control systems for leak free connections in CIPP lined potable water mains.

Our Fusible PVC® technology contains proprietary polyvinyl chloride (“PVC”) formulation that, when combined with its patented fusion process, results in a monolithic, fully-restrained, gasket-free, leak-free piping system. Fusible PVC® pipe products include Fusible C-900® and FPVC® pipes. Fusible C-900® pipes comply with the AWWA C900 standard and are certified to the NSF/ANSI Standard 61.

Our Tyfo® system applies high-strength fiber fabric to strengthen structures, including pipelines, and the connections between structural components, thereby strengthening, repairing and restoring masonry, concrete, steel and wooden structures. Beyond general strengthening of pipelines and structures, the Tyfo® system also has application in blast mitigation and seismic reinforcement.

See “Patents and Proprietary Technologies” below for more information concerning certain of these technologies.

Corrosion Protection

Our Tite Liner® system is a method of lining new and existing pipe with a corrosion and abrasion resistant thermoplastic pipe.

Our Safetyliner™ product is a grooved thermoplastic liner that is installed in an industrial pipeline using the Tite Liner® process. The Safetyliner™ liner is normally used in natural gas or CO2 pipelines to allow the release of gas that permeates the thermoplastic liner. If gas is allowed to build in the annular space under normal operating conditions, the line can be susceptible to collapse upon sudden changes in operating pressures. The Safetyliner™ liner also has been used in pipelines as a leak detection system and for dual containment in mine water pipelines.

The fusion bonded epoxy application process utilizes heat to melt a dry powder FBE coating material into liquid form. The liquid material flows onto the steel pipe and solidifies through a process called cross-linking. Once cooled, this “fusion-bonded” epoxy cannot return to its original state and forms a corrosion protection barrier on the interior or exterior surface of the pipe.

Our 3-layer polyethylene coating is an external coating for buried or submerged oil or gas pipelines and offers superior adhesion, cathodic disbondment resistance and mechanical protection.

Our deepwater coating and insulation capabilities answer the challenge of subsea wet insulation requirements for high-pressure and high-temperature environments. Applications include subsea equipment and field joints for coating the girth welds where the pipe coating has been cutback to allow for welding joints of pipe.

Our internal field joint coating technology consists of self-contained robots that travel inside the pipe, find the weld and then blast clean, vacuum and coat the area. Utilizing various cameras, these field joint coating robots transmit a real-time video image back to the operator which is then used for control and inspection. The technology allows for the field application of FBE and plural component liquid materials to the weld area.

Cathodic protection is an electrochemical process that prevents corrosion of new structures and stops corrosion on existing structures. Metal loss is prevented by the passing of a very small direct current from a cathodic protection electrode (anode), through the electrolyte (soil, water, concrete, etc.) on to the structure to be protected (cathode). In this process, the anode corrodes, sacrificing itself to protect the integrity of the cathode. Structures commonly protected by this process include oil and gas pipelines, offshore platforms, above and underground storage tanks, ships, electric power plants, bridges, parking garages, transit systems and water and wastewater facilities.

Our CorrFlex® system is a linear anode system installed parallel to pipelines, oftentimes to prevent stress corrosion cracking that can lead to ruptures on high pressure gas transmission pipelines.

Our CorrSpray® product provides a unique solution for preventing corrosion of steel reinforcements in concrete structures.

Our Corrporwer® DC power supplies include innovative designs, plus remote monitoring and control capabilities.

Our Green Rectifier® system is an ecologically friendly method of cathodic protection using solar panels and a wind generator to power the cathodic protection process.

Our Grid™ system has set the global standard for preventing releases from external corrosion of at-grade storage tanks containing oil and petroleum products, thereby ensuring safe operations and protection of the environment.
Our AC interference mitigation solution protects pipeline operators and the public from electrical hazards when pipelines share space on rights-of-way with overhead electric transmission lines. Beginning with advanced predictive modeling, we then design mitigation schemes and provide systems to protect people and the pipeline.
Our asset integrity management platform allows for the collection, communication and storage of data in a geospatial information system-based, centralized, integrated repository that provides us and our customers more timely information and improved data analytics. Data collection applications include LiveLine™ and CIS View™, data delivery applications include AssetView™ and FieldLine®, and data analytical tools include ScanLine™, ChargeLine® and BaseLine.™
See "Patents and Proprietary Technologies" below for more information concerning certain of these technologies.
Energy Services
Our DelayTrak® system identifies delays in real time. The data is used to identify and quickly communicate improvement opportunities and, later, action plans for improvement.
Our TimeTrak™ system tracks how time is spent by crews on a jobsite. The data is used to drive process improvements in routine maintenance.
Operations
We are organized into three operating segments, which are also our reportable segments: Infrastructure Solutions, Corrosion Protection and Energy Services. Each segment is regularly reviewed and evaluated separately.
Our operations are generally project oriented. Projects may range in duration from just a few days to several years and can be performed as one-time contracts or as part of longer-term agreements. These contracts are usually obtained through competitive bidding or negotiations and require performance at a fixed price or time and materials basis. Our Corrosion Protection and Energy Services projects are generally performed under contracts with industrial entities. A majority of our water and wastewater rehabilitation installation projects in our Infrastructure Solutions segment are performed under contracts with municipal entities. Independent contractors may be utilized to perform portions of the work on any given project that we provide.
Infrastructure Solutions Operations
Our water and wastewater pipeline rehabilitation activities are conducted principally through installation and other construction operations performed directly by our subsidiaries.
Our North American Infrastructure Solutions operations, including research and development, engineering, training and financial support systems, are headquartered in St. Louis, Missouri. Tube manufacturing and processing facilities for North America are maintained in ten locations, geographically dispersed throughout the United States and Canada to support our North American contracting operations and through which we sell liners to third parties, domestically and internationally.
We also conduct Insituform® CIPP process rehabilitation operations worldwide through our wholly-owned subsidiaries. We utilize multifunctional robotic devices developed by a wholly-owned French subsidiary in connection with the inspection and repair of pipelines. We also maintain a manufacturing facility in Wellingborough, United Kingdom and three processing facilities in Europe to support our international operations and through which we sell liners to third parties internationally.
We have granted licenses to our trenchless rehabilitation processes to unaffiliated companies in certain geographic regions. As described under "Ownership Interests in Operating Licensees and Joint Ventures" below, we have also entered into contractual joint ventures from time to time to capitalize on our trenchless rehabilitation processes. Under these contractual joint venture relationships, work is bid by the joint venture entity and subcontracted to the joint venture partners or to third parties. The joint venture partners are primarily responsible for their subcontracted work, but both joint venture partners are liable to the customer for all of the work. Revenues and associated costs are recorded using percentage-of-completion accounting for our subcontracted portion of the total contract only.
In addition to wastewater pipeline rehabilitation, we have performed water pipeline rehabilitation operations since 2006 using our pressure pipe product portfolio. We are now able to restore water pipes using our InsituMain® CIPP and the Tite Liner® and Tyfo® systems.

Our acquisition in February 2016 of Underground Solutions, headquartered in Poway, California, bolstered our capabilities with respect to water pipeline rehabilitation operations. We are now able to provide additional infrastructure technologies for water, wastewater and conduit applications, primarily Fusible PVC® pipe, which, when combined with its patented fusion process, results in a monolithic, fully-restrained, gasket-free, leak-free piping system.

Our infrastructure rehabilitation operations also utilize FRP to rehabilitate and strengthen pipelines throughout the United States through Fibrwrap Construction Services, headquartered in San Diego, California. We also design and manufacture FRP composite systems used for rehabilitating buildings, bridges, tunnels, industrial developments and waterfront structures, which we supply to certified applicators. We service the European FRP markets with respect to product and engineering services through our wholly-owned subsidiaries in the United Kingdom. We service the Asia-Pacific FRP market, with respect to both product and engineering services as well as application services, through our wholly-owned subsidiaries in Singapore, Malaysia, Hong Kong and New Zealand and through our joint ventures in Borneo and Indonesia. Finally, we have granted licenses to our proprietary FRP products and processes to unaffiliated companies in certain additional geographic regions, as described under "Licensees" and "Ownership Interests in Operating Licensees and Joint Ventures" below.

Corrosion Protection Operations

Our corrosion protection operations perform maintenance, rehabilitation and corrosion protection services for oil and gas, industrial and mineral piping systems and structures. We also offer products for gas release and leak detection systems. Our worldwide corrosion protection operations are headquartered in Houston, Texas and conducted through our various subsidiaries (Corrpro based in Houston, Texas; United Pipeline Systems based in Durango, Colorado; and Aegion Coating Services, LLC ("ACS") based in Tulsa, Oklahoma and Conroe, Texas). Certain of our corrosion protection operations outside of the United States are conducted through our wholly-owned subsidiaries in the United Kingdom, Chile, Canada, Saudi Arabia and through our joint venture in Oman.

Our Corrpro business performs fully-integrated corrosion prevention services including: (i) engineering and design; (ii) product and material sales; (iii) construction and installation; (iv) inspection, surveying, monitoring, data collection and maintenance; and (v) coatings. United Pipeline Systems performs pipeline rehabilitation and protection services using our proprietary Tite Liner® process. Our ACS business specializes in the application of internal corrosion coatings services, provision of external field joint anti-corrosion coating services and the supply of equipment, all for pipeline construction projects onshore and offshore in locations around the world.

Energy Services Operations

Aegion Energy Services is based in Irvine, California and performs construction, maintenance and turnaround services, primarily for the downstream oil and gas industry. Aegion Energy Services' operations are located primarily in California and Washington, however, our new wholly-owned turnaround specialty company, P2S ServTech, LLC, is headquartered in Texas. We specialize in offering clients a flexible, single source for all project needs. Clients may choose a single service or multiple integrated services, from technical consulting to turnkey project delivery, ongoing maintenance and scaffolding services. We provide project management professionals across various disciplines, including chemical, civil, structural, mechanical, electrical, instrumentation, project controls, estimating, procurement and safety. AllSafe Services, Inc., a wholly-owned subsidiary of Aegion Energy Services, provides safety field services.

Sweeping refinery industry changes occurred in California in recent years as a result of the implementation of California Health and Safety Code section 25536.7 (the "California Refinery Safety Law"). The California Refinery Safety Law introduced new requirements for refineries and outside contractors at certain facilities in California covered by the law. Over the past few years, Aegion Energy Services has successfully transitioned all of its clients' refinery operations covered by the California Refinery Safety Law to building trade union employees, as required by its clients in order to comply with the California Refinery Safety Law.

Licensees

We have granted licenses for the Insituform® CIPP process covering exclusive and non-exclusive territories to non-affiliated licensees that provide pipe repair and rehabilitation services throughout their respective licensed territories. The licenses generally grant to the licensee the right to utilize our know-how and patent rights (where such rights exist) relating to the subject process, and to use our copyrights and trademarks. These licenses have an average term of ten years with a right to renew.

Our CIPP licensees generally are obligated to pay a royalty at a specified rate. Any improvements or modifications a licensee may make in the subject process during the term of the license agreement generally becomes our property or is licensed to us. Should a licensee fail to meet its royalty obligations or other material obligations, we may terminate the license at our discretion. Licensees, upon prior notice to us, may generally terminate the license for certain specified reasons. We may vary the terms of agreements entered into with new licensees according to prevailing conditions. Income from royalties are immaterial to our overall consolidated revenues.

Our Fyfe joint ventures in Borneo and Indonesia provide design, product and engineering support to applicators of FRP systems in Asia-Pacific. Our joint ventures in Asia-Pacific are granted the non-exclusive right to use Fyfe products in their respective territories. Fyfe Co. also periodically licenses its patented technology to both affiliated and third-party certified applicators.

With regard to our Underground Solutions business, we have granted licenses to our Fusible PVC® pipe products and fusion processes internationally covering exclusive and non-exclusive territories to non-affiliated licensees that provide fusible PVC products and services. The licenses generally grant to the licensee, in exchange for royalties at a specified rate, the right to utilize our know-how and patent rights (where such rights exist) relating to the subject products and processes, and to use our copyrights and trademarks. Underground Solutions also licenses domestically its patented technology to third-party extruders and installers.

Ownership Interests in Operating Licensees and Joint Ventures

We hold controlling interests in Fyfe/Fibrwrap joint ventures in Borneo and Indonesia. Through our wholly-owned subsidiary, Fyfe Asia Pte. Ltd., we hold (i) a fifty-one percent (51%) equity interest in Fyfe Borneo Sdn Bhd., with the other forty-nine percent (49%) equity interest held by C. Tech Sdn Bhd; and (ii) a fifty-five percent (55%) equity interest in PT Fyfe Fibrwrap Indonesia, with the other forty-five percent (45%) equity interest held by PT Graha Citra Anugerah Lestari.

Through our subsidiary, INA Acquisition Corp., we hold a fifty-five percent (55%) equity interest in United Pipeline de Mexico S.A. de C.V., our licensee of the Tite Liner® process in Mexico. The remaining ownership interest is held by Miller Pipeline de Mexico S.A. de C.V., an unaffiliated Mexican company. As discussed in “Strategic Initiatives and Key Divestitures” above, we are currently in the process of exiting this joint venture as part of the 2017 Restructuring.

Through our subsidiary, Corrpro Canada, Inc., we hold a seventy-percent (70%) equity interest in Corrpower International Limited (“Corrpower”) based in Saudi Arabia, through which we provide fully integrated corrosion prevention products and services to government and private sector clients throughout the Kingdom of Saudi Arabia. The other thirty-percent (30%) equity interest is held by Saudi Trading & Research Co., Ltd., based in Al-Khobar, Saudi Arabia. As discussed in “Strategic Initiatives and Key Divestitures” above, we are currently in the process of exiting this joint venture as part of the 2017 Restructuring.

Through our subsidiary, Insituform Technologies Netherlands B.V., we hold a fifty-one percent (51%) equity interest in United Special Technical Services LLC located in Oman for the purpose of executing pipeline, piping and flow line thermoplastic lining services throughout the Middle East and Northern Africa. The other forty-nine percent (49%) equity interest is held by Special Technical Services LLC, an Omani company.

Through our subsidiary Aegion International Holdings Limited, we hold a sixty percent (60%) equity interest in Aegion South Africa Proprietary Limited located in South Africa, through which we provide pipeline rehabilitation products and services in East and Southern Africa. The other forty percent (40%) equity interest is held by Robor Proprietary Limited, a South African manufacturer and supplier of steel pipe. As discussed in “Strategic Initiatives and Key Divestitures” above, we are currently in the process of exiting this joint venture as part of the 2017 Restructuring.

We have previously entered into teaming and other cooperative arrangements in various geographic regions throughout the world in order to develop cooperative bids on contracts for our thermoplastic pipeline rehabilitation and cathodic protection businesses. Typically, the arrangements provide for each participant to complete its respective scope of work, and we are not required to complete the other participant’s scope of work. We continue to investigate opportunities for expanding our business through such arrangements.

We previously entered into contractual joint ventures in other geographic regions in order to develop joint bids on contracts for our wastewater pipeline rehabilitation business. Typically, the joint venture entity holds the contract with the owner and subcontracts portions of the work to the joint venture partners. As part of the subcontracts, the partners usually provide bonds to the joint venture. We could be required to complete our joint venture partner’s portion of the contract if the partner were unable to complete its portion and a bond is not available. We continue to investigate opportunities for expanding our business through such arrangements.

Product Development

We seek out and develop innovative solutions for pipelines and other infrastructure through a stage-gate process for management of our research and development initiatives. The process is executed under the direction of our Chief Technical Officer with a market and business impact evaluation at each gate review. Corporate and business unit resources make up the specific research and development teams, supplemented, where beneficial, by our technology partners (often major suppliers), outside consultants and academic institutions. During the years ended December 31, 2018, 2017 and 2016, we spent $5.6 million, $4.2 million and $4.7 million, respectively, on research and development related activities, including engineering.

Customers and Marketing

We offer our products and services to highly diverse markets worldwide. We service municipal, state and federal governments, as well as corporate customers in numerous industries including pipelines, energy, oil and gas, refinery, mining, general and industrial construction, infrastructure (buildings, bridges, tunnels, railways, etc.), water and wastewater, transportation, utilities, maritime and defense. Our products and services are currently utilized and performed in over 80 countries across six continents.

We offer our corrosion protection solutions worldwide to energy, refinery, mining and other customers to protect new and existing pipelines and other structures. The marketing of wastewater pipeline rehabilitation technologies is focused primarily on the municipal wastewater markets worldwide. We offer our water rehabilitation products to municipal and commercial customers. We offer our other infrastructure rehabilitation products worldwide to certain certified third-party installers and applicators and market our engineering, manufacturing and, in some countries, installation services to municipal, state, federal and commercial customers. We offer our Energy Services solutions primarily to the oil and gas markets on the West Coast, but have been actively pursuing opportunities beyond the West Coast. No customer accounted for more than 10% of our consolidated revenues during the years ended December 31, 2018 or 2016. During the year ended December 31, 2017, we had one customer that accounted for approximately 12.1% of our consolidated revenues primarily due to a large deepwater pipe coating and insulation project that was substantially completed during the year.

To help shape decision-making at every step, we use a highly-trained, multi-level sales force structured around target markets and key accounts, focusing on engineers, contractors, consultants, administrators, technical staff and public officials. Due to the technical nature of our products and services, many of our sales personnel have engineering or technical expertise and experience. We also produce sales literature and presentations, participate in trade shows, present at conferences and execute other marketing programs for our own sales force and those of unaffiliated licensees. Our unaffiliated licensees are responsible for marketing and sales activities in their respective territories. See “Licensees” and “Ownership Interests in Operating Licensees and Joint Ventures” above for a description of our licensing operations and for a description of investments in licensees.

Contract Backlog

Contract backlog is our expectation of revenues to be generated from received, signed and uncompleted contracts, the cancellation of which is not anticipated at the time of reporting. We assume that these signed contracts are funded. For government or municipal contracts, our customers generally obtain funding through local budgets or pre-approved bond financing. We generally do not undertake a process to verify funding status of these contracts and, therefore, cannot reasonably estimate what portion, if any, of our contracts in backlog have not been funded. However, we have little history of signed contracts being canceled due to the lack of funding. Contract backlog excludes any term contract amounts for which there are not specific and determinable work releases and projects where we have been advised that we are the low bidder, but have not formally been awarded the contract.

In accordance with industry practice, substantially all of our contracts are subject to cancellation, termination or suspension at the discretion of the customer. Contracts in our backlog are subject to changes in scope and of services to be provided as well as adjustments to the costs relating to the contracts. Accordingly, backlog is not necessarily indicative of our future revenues or earnings.

Included within backlog for Energy Services are amounts that represent expected revenues to be realized under long-term Master Service Agreements (“MSAs”) and other signed contracts. If the remaining term of these arrangements exceeds 12 months, the unrecognized revenues attributable to such arrangements included in backlog are limited to only the next 12 months of expected revenues. Although backlog represents only those contracts and MSAs that are considered to be firm, there can be no assurance that cancellation or scope adjustments will not occur with respect to such contracts.

Included within backlog for Infrastructure Solutions and Corrosion Protection are certain contracts that are performed through our variable interest entities in which we own a controlling portion of the entity. With the exception of Energy Services, a substantial majority of our contracts in these two segments are fixed price contracts with individual private businesses and municipal and federal government entities across the world. Energy Services generally enters into cost reimbursable contracts that are based on costs incurred at agreed upon contractual rates.

For additional information regarding our backlog including those risk factors specific to backlog, please refer to “Risk Factors” in Item 1A, and “Management’s Discussion and Analysis of Financial Condition and Results of Operations” in Item 7 below.

Manufacturing and Suppliers

We maintain our North American Insituform® CIPP process liner manufacturing facility in Batesville, Mississippi. In Europe, we manufacture and sell Insituform® CIPP process liners from our plant located in Wellingborough, United Kingdom. Although raw materials used in Insituform® CIPP process products are typically available from multiple sources, our historical practice has been to purchase materials from a limited number of suppliers. We maintain our own felt manufacturing facility in Batesville, Mississippi. Substantially all of our fiber requirements are purchased from two sources, but there are alternate vendors readily available. We source our global resin supply from multiple vendors. We also manufacture certain equipment used in our Insituform® CIPP business. We believe that the sources of supply for our Insituform® CIPP operations in North America, Europe and Asia-Pacific are adequate for our needs.

We sell Insituform® CIPP process liners and related products to third parties and certain licensees on a long-term or, in certain instances, on a project-by-project basis. In Europe, in addition to sales made on a project-by-project basis, we have entered into supply agreements with three third parties to supply them with Insituform® CIPP process liners and related products.

With regard to Underground Solutions, we have three qualified third-party extruders to manufacture our Fusible PVC® pipe products.

The principal raw materials used by Fyfe Co. in the manufacture of FRP composite materials are carbon, glass, resins, fabric and epoxy raw materials. Fabric and epoxies are the most significant materials purchased, which are currently purchased through a select group of suppliers, although these and the other materials are available from a number of vendors. The weaving of FRP components into woven fabric is done at our facility in La Conner, Washington. Fyfe Co. does specialized blending of unique epoxies from basic chemicals at our Batesville, Mississippi facility. The epoxy resin is also repackaged at our Batesville, Mississippi facility, and specialized blending is also often done on each job site. Fyfe Co. also sells finished materials throughout the United States and worldwide to our affiliates and certain certified third-party applicators.

Product and material revenues for our Corrpro business are derived principally from the sale of products that are purchased from select outside vendors or from assembling components that are sourced from suppliers. We conduct light assembly for a number of our Corrpro products in our production facilities in Sand Springs, Oklahoma; Edmonton, Alberta, Canada; and the United Kingdom. In addition, we manufacture our own line of rectifiers and other power supplies in Canada and the United Kingdom. The primary products and raw materials used by our Corrpro businesses include zinc, aluminum, magnesium and other metallic anodes, as well as wire and cable. We maintain relationships with multiple vendors for these products and are not dependent on any single vendor to meet our supply needs.

The product and service revenues for our United Pipeline Systems business are derived primarily from the procurement and installation of HDPE liners inside pipelines. The raw material used for these liners is extruded thermoplastic pipe. It has been our practice to purchase this material from a select group of suppliers; however, we believe that it is available from many other sources. We manufacture most of the proprietary equipment and many of the consumable items used in Tite Liner® system installations in our own facilities in Canada, the United States and Chile.

Product and service revenues for our ACS business is derived principally from internal and external pipeline coating. Facilities are located in Tulsa, Oklahoma, Conroe, Texas and Saudi Arabia. The primary raw materials used in the coating process include FBE and paint. Although our historical practice has been to purchase materials from a limited number of suppliers, we believe that the raw materials used in the coating process are typically available from multiple sources. However, in certain limited circumstances, our customer has required use of a specific material available from only a single source.

Our pricing of raw materials is subject to fluctuations in the underlying commodity prices. See “Commodity Risk” in Item 7A of this Report for detail on our management of the risks associated with such price fluctuations.

Patents and Proprietary Technologies

As of December 31, 2018, we held 32 United States patents relating to the Insituform® CIPP process. As of December 31, 2018, we had seven pending United States patent applications relating to the Insituform® CIPP process. We have obtained and are pursuing patent protection in our principal foreign markets covering various aspects of the Insituform® CIPP process. As of December 31, 2018, there were 87 issued foreign patents relating to the Insituform® CIPP processes, and 15 applications pending in foreign jurisdictions. Of the applications pending in foreign jurisdictions, one is a Patent Cooperation Treaty (“PCT”) application that covers most jurisdictions throughout the world and one is a European Patent Convention (“EPC”) application that covers multiple jurisdictions in Europe.

As of December 31, 2018, we held 15 United States patents and 13 foreign patents with regard to Fusible PVC® pipe products and fusion processes as well as other infrastructure technologies for water, wastewater and conduit applications that relate to our Fusible PVC® pipe lining business.

As of December 31, 2018, we held 16 issued patents and two pending patent applications in the United States and eight issued patents and five pending patent applications in foreign jurisdictions that relate to our Tyfo® system. Of these applications, one is an EPC application that covers multiple jurisdictions in Europe.

For our coating operations, as of December 31, 2018, we held seven issued patents and four pending patent applications in the United States and 10 issued patents and six pending patent applications in foreign jurisdictions. Of the foreign applications, one is a PCT application that covers most jurisdictions throughout the world.

As of December 31, 2018, we had five issued patents and one pending patent application in the United States, and nine issued patents and six pending patent applications in foreign jurisdictions that relate to the Tite Liner® process. Of the foreign applications, one is an EPC application that covers multiple jurisdictions in Europe.
For our cathodic protection operations, as of December 31, 2018, we have three pending patent applications in the United States and two pending applications in foreign jurisdictions. Of the foreign applications, one is a PCT application that covers most jurisdictions throughout the world.
The specifications and/or rights granted in relation to each patent will vary from jurisdiction to jurisdiction. In addition, as a result of differences in the nature of the work performed and in the climate of the countries in which the work is carried out, we do not necessarily seek patent protection for all of our inventions in every jurisdiction in which we do business.
There can be no assurance that the validity of our patents will not be successfully challenged. Our business could be adversely affected by increased competition upon expiration of the patents or if one or more of our patents were adjudicated to be invalid or inadequate in scope to protect our operations. We believe in either case that our long experience with the proprietary processes, the strength of our trademarks and our degree of market penetration should enable us to continue to compete effectively in the pipeline rehabilitation, corrosion protection, energy, mining and infrastructure protection markets.
In some instances throughout each of our three platforms, we have elected to maintain certain internally developed technologies, know-how and inventions as trade secrets. We have entered into confidentiality agreements with employees, consultants and third parties to whom we disclose such trade secrets. Although there can be no assurance that these measures will suffice to prevent unauthorized disclosure or use or that third parties will not develop similar technologies, we believe it would take substantial time and resources to independently develop such technologies.
See “Risk Factors” in Item 1A of this Report for further discussion.

Competition

The markets in which we operate are highly competitive, primarily on the basis of price, quality of service and capacity to perform. Many of our products and services face direct competition from competitors offering similar or essentially equivalent products or services. In addition, customers can select a variety of methods to meet their infrastructure installation, strengthening and rehabilitation needs, as well as their coating and cathodic protection needs, including a number of methods that we do not offer.
In the trenchless wastewater rehabilitation market, the CIPP process is one of the preferred rehabilitation methods. Because relatively few significant barriers to entry exist in this market, any organization with adequate financial resources and access to technical expertise may become a competitor. As such, there are numerous companies with which we compete. Worldwide, we compete with numerous smaller firms on local or regional levels and with several larger firms on the global and national levels. Despite the number of competitors, Insituform®, as the worldwide pioneer of this technology, has maintained its role as a global market leader, both in the United States and abroad.
In water rehabilitation, dig-and-replace is still the preferred method for the majority of customers. Currently, we believe CIPP is utilized in less than 5% of water pipeline rehabilitation projects in the United States. Because this is a more specialized field, with more barriers to entry, including strict government mandates, we compete primarily with a handful of global and national specialty contractors.
Our Fusible PVC® products compete against other more-traditional products in the pressure pipe market, such as HDPE and other restrained joint PVC pipe products.
In our infrastructure rehabilitation business, the FRP process competes against traditional methods of pipeline and structural retrofitting, but is gaining acceptance in the construction and retrofitting industries. With its proprietary technologies relating to both products and application, Fyfe Co. is a leader in the FRP market and Fibrwrap Construction, having successfully performed installations of FRP systems for 25 years, is one of the most experienced applicators of the Tyfo® system and has a well-established reputation. In this field, there are barriers to entry, including testing requirements, experience, intellectual property and certifications. Fyfe has teamed with a number of universities around the world to conduct extensive product testing. In addition, Fyfe has dedicated significant resources to obtaining technical market acceptance of its proprietary products. As a result, Fyfe has received a number of certifications, including NSF certification for its Tyfo® system; International Code Council - Evaluation Service

Report (ESR-2103), indicating product approval by the International Building Code; and compliance with ICC-AC125 guidelines for FRP strengthening. Because of the barriers to entry, Fyfe Co. and Fibrwrap Construction tend to compete with a small number of companies on a regional or national level, most of which do not provide the full spectrum of services provided by Fyfe Co. and Fibrwrap Construction.

In our Corrosion Protection segment, Corrpro operates in the highly-competitive field of cathodic protection for corrosion control. While this market is highly competitive, because there are relatively few barriers to entry, Corrpro is a recognized market leader in North America in this field. Competitors include a limited number of large firms, which provide services nationally and, in some instances, globally, although more prevalent are a number of small- and medium-sized firms with more limited portfolios of products and services, which are only provided on a regional or local level. Corrpro's competitive advantage is its broad depth of high-quality cathodic protection offerings, including its cost-effective engineering, pipeline integrity, construction and coating services, which are provided to customers worldwide.

The process of utilizing thermoplastic liners is a prevalent method used to protect pipelines servicing the energy and mining industries. United Pipeline Systems is recognized as a leader in the thermoplastic market, having provided relining solutions on six continents. Due to barriers to entry arising from necessary technological capabilities, United Pipeline Systems mainly competes with a small number of specialty firms globally, nationally and regionally. Through our focused efforts on expanding our services worldwide, United Pipeline Systems enjoys significant name recognition and substantial market share in this industry in the key energy and mining regions of the world.

ACS has a strong presence in the field of FBE coating and is an industry leader in both inner diameter robotic coatings and outer diameter coatings. Because of these specialized fields, ACS usually competes with a small number of specialty providers.

Aegion Energy Services operates in a fragmented and intensely competitive field of plant maintenance and construction and specialty services in the downstream oil refining industry, as well as performing work in the industrial and natural gas, gas processing and compression markets. Competitors may be local, regional or national contractors and service providers and vary with the markets that are served, with few competitors competing in all of the geographic markets we serve or offering all of the services we provide. With the implementation of the California Refinery Safety Law, competition at refineries in California is from building trade union contractors or, in some instances, from customers themselves expanding their own workforces to reduce reliance on contractors. Contracts are generally awarded based on safety performance, reputation for quality, price, schedule and client satisfaction. However, with the new California Refinery Safety Law in place, the trade unions have increasing influence in the California labor market and on union contractors. Issues around labor relations and access to supplemental labor are new factors affecting client decisions in selecting contractors.

There can be no assurance as to the success of our processes in competition with our competitors and alternative technologies for pipe installation and rehabilitation, coating, cathodic protection and infrastructure installation, strengthening and rehabilitation.

Seasonality

Our operations can be affected by seasonal variations and our results tend to be stronger in the second and third quarters of each year due to typically milder weather in the regions in which we operate. We are more likely to be impacted by weather extremes, such as excessive rain, hurricanes or monsoons, snow and ice or frigid temperatures, which may cause temporary, short-term anomalies in our operational performance in certain localized geographic regions. However, these impacts usually have not been material to our operations as a whole. See "Risk Factors" in Item 1A of this Report for further discussion.

Employees

As of December 31, 2018, we had approximately 5,350 employees. Certain of our subsidiaries are parties to collective bargaining agreements that covered an aggregate of approximately 1,500 employees as of December 31, 2018. We generally consider our relations with our employees and unions to be good.

Insurance and Bonding

We are required to carry insurance and provide bonding in connection with certain projects and, accordingly, maintain comprehensive insurance policies, including workers' compensation, general and automobile liability and property coverage. We believe that we presently maintain adequate insurance coverage for all operations. We have also arranged bonding capacity for bid, performance and payment bonds. Typically, the cost of a performance bond is less than 1% of the contract value. We are required to indemnify the surety companies against losses from third-party claims of customers and subcontractors. The indemnification obligations are collateralized by unperfected liens on our assets and the assets of those subsidiaries that are parties to the applicable indemnification agreement.

Government Regulation

We are required to comply with all applicable United States federal, state and local, and all applicable foreign statutes, regulations and ordinances. In addition, our installation and other operations have to comply with various relevant occupational safety and health regulations, transportation regulations, code specifications, permit and licensing requirements and bonding and insurance requirements, as well as with fire regulations relating to the storage, handling and transporting of flammable materials. Our manufacturing and coatings facilities, as well as our installation and other operations, are subject to federal and state environmental protection regulations, none of which presently have any material effect on our capital expenditures, earnings or competitive position in connection with our present business. However, although our installation and other operations have established monitoring programs and safety procedures, further restrictions could be imposed on the manner in which installation and other activities are conducted, on equipment used in installation and other activities, on volatile organic compounds and hazardous air pollutant emissions from our paintings and coatings processes and on the use of solvents or the thermosetting resins used in the Insituform® CIPP process.

The use of both thermoplastics and thermosetting resin materials in contact with drinking water is strictly regulated in most countries. In the United States, a consortium led by NSF International, under arrangements with the United States Environmental Protection Agency ("EPA"), establishes minimum requirements for the control of potential human health effects from substances added indirectly to water via contact with treatment, storage, transmission and distribution system components, by defining the maximum permissible concentration of materials that may be leached from such components into drinking water, and methods for testing them. Our lining and coating products for drinking water use are NSF/ANSI Standard 61 compliant, including the entire Tyfo® system, the full range of Insituform® water pipe lining products and our Fusible C-900® and Fusible C-905® products. In addition, our Tite Liner® HDPE system is certified to NSF/ANSI Standard 61. Corrpro's corrosion control products are NSF/ANSI Standard 61 classified for drinking water systems and its cathodic protection solutions for water storage tanks and water treatment units are compliant with AWWA Standard D104 and NACE recommended practices. NSF assumes no liability for use of any products, and NSF's arrangements with the EPA do not constitute the EPA's endorsement of NSF, NSF's policies or its standards. Dedicated equipment is needed in connection with use of these products in drinking water applications.

Item 1A. Risk Factors.

You should carefully consider the following risks and other information contained or incorporated by reference into this Report when evaluating our business and financial condition and an investment in our common stock. Should any of the following risks or uncertainties develop into actual events, such developments could have material adverse effects on our business, financial condition, cash flows and results of operations.

Our businesses face significant competition in the industries in which they operate.

Many of our products and services face direct competition from companies offering similar products or services. Competition can place downward pressure on our contract prices and profit margins. Intense competition is expected to continue in these markets. If we are unable to realize our objectives, we could lose market share to our competitors and experience an overall reduction in our profits.

In the water and wastewater rehabilitation portion of our Infrastructure Solutions segment, we face competition from companies providing similar products and services as well as companies providing other methods of rehabilitation that we do not offer, including traditional dig-and-replace, which is still the preferred method in the water rehabilitation market. In the trenchless wastewater rehabilitation market, CIPP is one of the preferred methods. In this market, few significant barriers to entry exist and, as a result, any organization that has the financial resources and access to technical expertise and bonding may become a competitor. As such, we compete with many smaller firms on a local or regional level and with several larger firms on the global and national levels. In water rehabilitation, where there are more significant barriers to entry because the market is strictly regulated, we compete with a smaller number of specialty contractors around the world. Further, our Fusible PVC® pipe products compete against other more traditional products, such as HDPE and restrained joint PVC pipe products.

In the infrastructure rehabilitation portion of our Infrastructure Solutions segment, the Tyfo® system competes against traditional methods of structural retrofitting. There are significant barriers to entry, including testing requirements, experience, intellectual property and certifications. In manufacturing, we only compete with a handful of FRP suppliers. However, with respect to installation, we compete with a number of FRP applicators. Our ability to grow revenues in this market could be adversely impacted if any of our competitors were to become fully-integrated like us or if new entrants in the market were to develop strong installation and manufacturing expertise.

In our Corrosion Protection platform, we compete primarily with specialty firms in the pipeline protection industry and both a limited number of large firms globally and a large number of smaller firms regionally in the cathodic protection industry. In addition, customers can select a variety of methods to meet their pipe installation, rehabilitation, coating and cathodic protection needs, including methods that we do not offer.

In our Energy Services platform, we compete with a limited number of local, regional and national companies in the oil and gas procurement, construction, maintenance, scaffolding and turnaround industries on the U.S. West Coast.

Our business depends upon the maintenance of our proprietary technologies and information.

We depend on our proprietary technologies and information, many of which are no longer subject to patent protection. We rely principally upon trade secret and copyright laws to protect our proprietary technologies. We regularly enter into confidentiality agreements with our key employees, customers, potential customers and other third parties and limit access to and distribution of our trade secrets and other proprietary information. However, these measures may not be adequate to prevent misappropriation of our technologies or to assure that our competitors will not independently develop technologies that are substantially equivalent or superior to our technologies. In addition, the laws of other countries in which we operate may not protect our proprietary rights to the same extent as the laws of the United States. We are also subject to the risk of adverse claims and litigation alleging infringement of intellectual property rights.

Our efforts to develop new products and services or enhance existing products and services involve substantial research, development and marketing expenses, and the resulting new or enhanced products or services may not generate sufficient revenues to justify such expenses.

Our future success will depend in part on our ability to anticipate and respond to changing technologies and customer requirements by enhancing our existing products and services. We will need to develop and introduce, on a timely and cost-effective basis, new products, features and services that address the needs of our customer base. As a result of these efforts, we may be required to expend substantial research, development and marketing resources, and the time and expense required to develop a new product or service or enhance an existing product or service are difficult to predict. We cannot assure that we will succeed in developing, introducing and marketing new products or services or product or service enhancements. In addition, we cannot be certain that any new or enhanced product or service will generate sufficient revenues to justify the expenses and resources devoted to this product development and enhancement effort.

Acquisitions and investments could result in operating difficulties, dilution and other harmful consequences that may adversely impact our business and results of operations.

Acquisitions are an element of our overall corporate strategy and use of capital, and these transactions could be material to our financial condition and results of operations. We expect to continue to evaluate and enter into discussions regarding a wide array of potential strategic transactions. The process of integrating an acquired company, business or technology has created, and will continue to create, unforeseen operating difficulties and expenditures. The areas where we face risks include:

- Diversion of management time and focus from operating our business to acquisition integration challenges.
- Failure to successfully operate and further develop the acquired business or technology.
- Implementation or remediation of controls, procedures and policies at the acquired company.
- Integration of the acquired company's accounting, human resource and other administrative systems, and coordination of product, engineering and sales and marketing functions.
- Transition of operations, users and customers onto our existing platforms.
- Failure to obtain required approvals or consents on a timely basis, if at all, including from governmental authorities or contractual counter-parties, or conditions placed upon approval or consent, including under competition and antitrust laws, which could, among other things, delay or prevent us from completing a transaction, or otherwise restrict our ability to realize the expected financial or strategic goals of an acquisition.
- In the case of foreign acquisitions, the need to integrate operations across different cultures and languages and to address the particular economic, currency, political and regulatory risks associated with specific countries.
- Cultural challenges associated with integrating employees from the acquired company into our organization, and retention of key employees from the businesses we acquire.
- Liability for activities of the acquired company before the acquisition, including patent and trademark infringement claims, violations of laws, commercial disputes, tax liabilities and other known and unknown liabilities.
- Assumption of contracts with terms, including, without limitation, terms relating to liability, waiver of damages and indemnification, that are not consistent with our normal contracting practices.
- Litigation or other claims in connection with the acquired company, including claims from terminated employees, customers, former stockholders or other third parties.

Our failure to address these risks or other problems encountered in connection with our past or future acquisitions and investments could cause us to fail to realize the anticipated benefits of such acquisitions or investments, incur unanticipated costs or liabilities, and harm our business generally.

Our acquisitions could also result in dilutive issuances of our equity securities, the incurrence of debt, the assumption of contingent liabilities, amortization expenses, impairment of goodwill and purchased long-lived assets and restructuring charges, any of which could harm our financial condition or results of operations. Also, the anticipated benefit of many of our acquisitions may not materialize for reasons separate and apart from the specific risks set forth above.

We may be liable to complete the work of our joint venture partners under our joint venture arrangements.
We enter into contractual joint ventures in order to develop joint bids on certain contracts. The success of these joint ventures depends largely on the satisfactory performance by our joint venture partners of their obligations with respect to the

joint venture. Under these joint venture arrangements, we may be required to complete our joint venture partner's portion of the contract if the joint venture partner is unable to complete its portion and a bond is not available. In such case, the additional obligations could result in reduced profits or, in some cases, significant losses for us.

Our backlog is an uncertain indicator of our future earnings.

Our backlog, which at December 31, 2018 was approximately $669.4 million, is subject to unexpected adjustments and cancellation. The revenues projected in this backlog may not be realized or, if realized, may not result in profits. We may be unable to complete some projects included in our backlog in the estimated time and, as a result, such projects could remain in backlog for extended periods of time. Further, our customers often have the contractual right to terminate our contract or reduce our scope of our work at the convenience of the customer. To the extent that we experience project or contract cancellation or scope adjustments, we could face a reduction in the dollar amount of our backlog and the revenues that we actually receive from such backlog. In addition, one or more of our large or multi-year contracts have in the past and may in the future contribute a material portion of our backlog in any one year. The loss of business from any one of these significant customers could have a material adverse effect on our business or results of operations.

The preparation of our consolidated financial statements requires us to make estimates and judgments, which are subject to an inherent degree of uncertainty and which may differ from actual results.

Our consolidated financial statements are prepared in accordance with accounting principles generally accepted in the United States, which require us to make estimates and judgments that affect the reported amounts of assets, liabilities, revenues and expenses and related disclosure of contingent assets and liabilities. Some accounting policies require the application of significant judgment by management in selecting the appropriate assumptions for calculating financial estimates. By their nature, these estimates and judgments are subject to an inherent degree of uncertainty and actual results may differ from these estimates and judgments under different assumptions or conditions, which may have an adverse effect on our financial condition or results of operations in subsequent periods.

Our use of input measures to recognize revenue on construction, engineering and installation services could result in a reduction or reversal of previously recorded results.

Revenues from construction, engineering and installation services are recognized over time using an input measure to measure progress toward satisfying performance obligations. This methodology recognizes revenues and profits over the life of a project based on costs incurred to date compared to total estimated project costs. Revisions to revenues and profits are made once amounts are known and can be reasonably estimated. Given the uncertainties associated with some of our contracts, it is possible for actual costs to vary from estimates previously made. Revisions to estimates could result in the reversal of revenues and gross profit previously recognized. For the year ended December 31, 2018, approximately 65% of our revenues were derived from accounting utilizing estimated input measures.

We may experience cost overruns on our projects.

We conduct a significant portion of our business under guaranteed maximum price or fixed price contracts, where we bear a significant portion of the risk for cost overruns. Under such contracts, prices are established in part on cost and scheduling estimates, which are based on a number of assumptions, including assumptions about future economic conditions, prices and availability of materials and other exigencies. Our profitability depends heavily on our ability to make accurate estimates. Inaccurate estimates, or changes in other circumstances, such as unanticipated technical problems, difficulties obtaining permits or approvals, changes in local laws or labor conditions, weather delays, cost of raw materials, trade disputes and tariffs, currency fluctuations or our suppliers' or subcontractors' inability to perform could result in substantial losses, as such changes adversely affect the revenues and gross profit recognized on each project.

Our recognition of revenues from change orders, extra work or variations in the scope of work could be subject to reversal in future periods.

We recognize revenues from change orders, extra work or variations in the scope of work as set forth in our written contracts with our clients when management believes that realization of these revenues is probable and the recoverable amounts can be reasonably estimated. We also factor in all other information that we possess with respect to the change order to determine whether the change order should be recognized at all and, if recognition is appropriate, what dollar amount of the change order should be recognized. Due to factors that we may not anticipate at the time of recognition, however, revenues ultimately received on these change orders could be less than revenues that we recognized in a prior reporting period or periods, which could require us in subsequent reporting periods to reduce or reverse revenues and gross profit previously recognized.

We may incur significant costs in providing services in excess of original project scope without having an approved change order.

After commencement of a contract, we may perform, without the benefit of an approved change order from the customer, additional services requested by the customer that were not contemplated in our contract price for various reasons, including customer changes, incomplete or inaccurate engineering, changes in project specifications and other similar information provided to us by the customer. Our construction contracts generally require the customer to compensate us for additional work or expenses incurred under these circumstances.

A failure to obtain adequate compensation for these matters could require us to record in the current period an adjustment to revenues and profit recognized in prior periods under the percentage-of-completion accounting method. Any such adjustments, if substantial, could have a material adverse effect on our results of operations and financial condition, particularly for the period in which such adjustments are made. We can provide no assurance that we will be successful in obtaining, through negotiation, arbitration, litigation or otherwise, approved change orders in an amount adequate to compensate us for our additional work or expenses.

Cyclical downturns in the mining, oil and natural gas industries, including a substantial or extended decline in the price of mined minerals, oil or natural gas, or in the oil field, refinery and mining services businesses, may have a material adverse effect on our financial condition or results of operations.

The mining, oil and natural gas industries are highly cyclical. Demand for the majority of the oil field, refinery and mining products and services provided by our Corrosion Protection and Energy Services platforms are substantially dependent on the level of expenditures by the mining, oil and natural gas industries for the exploration, development and production of mined minerals, crude oil and natural gas reserves, which are sensitive to the prices of these commodities and generally dependent on the industry's view of future mined mineral, oil and natural gas prices. The prices of these commodities can be volatile. There are numerous factors affecting the related industries and, thereby, the supply of, and demand for, our products and services, which include, but are not limited to:

- market prices of mined minerals, oil and natural gas and expectations about future prices;
- cost of producing mined minerals, oil and natural gas;
- the level of mining, drilling and production activity;
- the discovery rate of new oil and gas reserves;
- mergers, consolidations and downsizing among our clients;
- coordination by various oil-producing countries, including the Organization of Petroleum Exporting Countries (OPEC);
- the output and willingness to export of certain oil-producing countries;
- the impact of commodity prices on the expenditure levels of our clients;
- financial condition of our client base and their ability to fund capital and maintenance expenditures;
- political instability in oil-producing countries;
- tax incentives, including for alternative energy sources;
- domestic and worldwide economic conditions;
- adverse weather conditions, including those that can affect mining, oil or natural gas operations over a wide area;
- availability of energy sources other than oil and gas;
- level of consumption of minerals, oil, natural gas and petrochemicals by consumers, including the effects of increased regulation, conservation measures and technological advances affecting energy consumption; and
- availability of services and materials for our clients to grow their capital expenditures.

As seen in the historic high volatility in crude oil prices and other energy commodities, prices for mined minerals, oil and natural gas are subject to periodic downturns and large fluctuations in response to relatively minor changes in supply and demand, market uncertainty and a variety of other factors (including those set forth above) that are beyond our control, and we expect such prices to continue to be volatile. Demand for the products and services we provide could decrease in the event of a sustained reduction in demand for mined minerals, oil or natural gas, while perceptions of long-term decline in the prices of mined materials, oil and natural gas by mining, oil and gas companies (some of our customers) can similarly reduce or defer major expenditures given the long-term nature of many large-scale projects or result in downward pressure on the prices we charge. As such, a significant downturn in the mining, oil and/or natural gas industries could result in a reduction in demand for our mining, oil field and refinery services and could adversely affect our operating results. Additionally, the volatility of such prices and the resulting effects are difficult to predict, which reduces our ability to anticipate and respond effectively to changing conditions.

Our operations could be adversely impacted by the California Refinery Safety Law related to downstream work performed in California refineries.

Aegion Energy Services continues to face challenges from the impact of the California Refinery Safety Law, which went into effect on January 1, 2014. The law introduced new requirements for refineries and outside contractors at covered facilities

18

when construction, alteration, demolition, installation, repair or maintenance work is performed at the covered facility. The law imposes the following requirements:

- all subject workers must be paid the applicable prevailing wage rate;
- all subject workers must be either “skilled journeymen” or “registered apprentices”; and
- at least 60% of skilled journeypersons on the project must be graduates of certified apprenticeship programs.

The effect of the California Refinery Safety Law is to require the use of building trade union contractors or refinery owners or operators to perform the covered work.

These requirements only pertain to contracts entered into, extended or renewed after January 1, 2014. Contracts entered into, extended or renewed prior to that date generally expired in 2018 across the industry. Aegion Energy Services has historically had long-term contracts in place with many of its major downstream clients, which it intends to maintain through its building trade union entity. Throughout 2018, Aegion Energy Services was able to transition its contracts with all of its California refinery clients to its building trade union entity in order to satisfy the conditions of the California Refinery Safety Law. However, as a result of this drastic change in the market in California, customers are looking at ways to reduce costs. For example, many clients are reevaluating their contracting strategies and have reduced, or may in the future reduce, the size of their contractor maintenance crews by increasing their own in-house maintenance capabilities. There are no assurances that clients will maintain their contracts, or the historical annual volume of work, with Aegion Energy Services as the industry adapts to operating under the California Refinery Safety Law, which could materially and adversely impact its revenues.

Federal and state legislative and regulatory initiatives as well as governmental reviews relating to hydraulic fracturing could result in increased costs and additional operating restrictions or delays that could adversely affect our Corrosion Protection customers.

Federal, state and local legislative and regulatory initiatives relating to hydraulic fracturing could result in increased costs and additional operating restrictions or delays in the production of oil and natural gas, including from the developing shale plays. Our Corrosion Protection segment services oil and gas companies in the shale plays and we foresee strong market opportunities here. A decline in drilling of new wells and related servicing activities caused by these initiatives could have an adverse effect on our business, financial position or results of operations.

We may be subject to liabilities under environmental laws and regulations.

Our services are subject to numerous U.S. and international environmental protection laws and regulations that are complex and stringent. For example, we must comply with a number of U.S. federal government laws that strictly regulate the handling, removal, treatment, transportation, and disposal of toxic and hazardous substances. Under the Comprehensive Environmental Response Compensation and Liability Act of 1980, as amended (“CERCLA”), and comparable state laws, we may be required to investigate and remediate regulated hazardous materials. CERCLA and comparable state laws typically impose strict, joint and several liabilities without regard to whether a company knew of or caused the release of hazardous substances. The liability for the entire cost of clean-up could be imposed upon any responsible party. Other principal U.S. federal environmental, health, and safety laws affecting us include, but are not limited to, the Resource Conservation and Recovery Act, National Environmental Policy Act, the Clean Air Act, the Occupational Safety and Health Act, the Federal Mine Safety and Health Act of 1977, the Toxic Substances Control Act, and the Superfund Amendments and Reauthorization Act. Our business operations may also be subject to similar state and international laws relating to environmental protection. Further, past business practices at companies that we have acquired may also expose us to future unknown environmental liabilities. Liabilities related to environmental contamination or human exposure to hazardous substances, or a failure to comply with applicable regulations, could result in substantial costs to us, including clean-up costs, fines, civil or criminal sanctions, and third-party claims for property damage or personal injury or cessation of remediation activities. Our continuing work in the areas governed by these laws and regulations exposes us to the risk of substantial liability.

The effects of the Tax Cuts and Jobs Act on our business are still not fully known and could have an adverse effect on our business and financial condition.

Public Law No. 115-97, commonly referred to as the Tax Cuts and Jobs Act (the “TCJA”), was signed into law on December 22, 2017. The TCJA contains significant changes to corporate taxation, including reducing the corporate tax rate from 35% to 21%, limiting the tax deduction for interest expense to 30% of earnings (except for certain small businesses), limiting the deduction for net operating losses to 80% of current year taxable income and eliminating net operating loss carrybacks, one-time taxing of offshore earnings at reduced rates regardless of whether they are repatriated, eliminating U.S. tax on foreign earnings (subject to certain important exceptions), immediately deducting certain new investments instead of deducting depreciation expense over time, and modifying or repealing many business deductions and credits. We anticipate additional guidance, both at the federal and state level, to be forthcoming in 2019. As such, the impacts of the legislation may differ from our current estimates, interpretations and assumptions, possibly materially, and the amount of the impact on the Company may accordingly be adjusted over the course of 2019.

A general downturn in U.S. and global economic conditions, specifically a downturn in the municipal bond market, or government disruptions, including government shutdowns, may reduce our business prospects and decrease our revenues and cash flows.

Our business is affected by general economic conditions. Any extended weakness in the U.S. and global economies could reduce our business prospects and could cause decreases in our revenues and operating cash flows. Specifically, a downturn in the municipal bond market caused by an actual downgrade of monoline insurers could result in our municipal customers being required to spend municipal funds previously allocated to projects that would benefit our business to pay off outstanding bonds. A period of prolonged economic weakness could impact our customers' ability to pay bills in a timely manner and may result in customer bankruptcies. Untimely payment and customer bankruptcies may lead to increased bad debt expenses or other adverse effects on our financial position, results of operations and/or cash flows. In addition, government disruptions, such as government shutdowns, may delay or halt the granting and renewal of permits, licenses and other items required by us and our customers to conduct our business.

We conduct manufacturing, sales and distribution operations on a worldwide basis and are subject to a variety of risks associated with doing business outside the United States.

We maintain significant international operations, including operations in North America, Europe, Asia-Pacific, the Middle East and South America. For the years ended December 31, 2018, 2017 and 2016, approximately 28%, 24%, and 24%, respectively, of our revenues were derived from international operations. We expect a significant portion of our revenues and profits to come from international operations and joint ventures for the foreseeable future.

As a result, we are subject to a number of risks and complications associated with international manufacturing, sales, services and other operations. These include:

- difficulties in enforcing agreements, collecting receivables and resolving disputes through some foreign legal systems;
- foreign customers with longer payment cycles than customers in the United States;
- difficulties in enforcing intellectual property rights or weaker intellectual property right protections in some countries;
- tax rates in certain foreign countries that exceed those in the United States and foreign earnings subject to withholding requirements;
- tax laws that restrict our ability to use tax credits, offset gains or repatriate funds;
- tax laws that impose additional taxes on our operations, including the implementation of value added tax in certain countries in the Middle East;
- sanctions, tariffs, exchange controls, trade disputes (including so-called "trade wars") or other trade restrictions, including transfer pricing restrictions, when products produced in one country are sold to an affiliated entity in another country;
- difficulties with regard to, or taxes imposed on, the movement of cash between countries, including the repatriation of cash back to the United States;
- abrupt changes in foreign government policies and regulations;
- unsettled political conditions;
- acts of terrorism or criminality;
- kidnapping of employees;
- nationalization or privatization of companies with which we do business;
- protectionist policies in certain foreign countries, including those in the Middle East, that disfavor foreign companies operating in such countries;
- forced negotiation or modification of contracts;
- increased governmental ownership and regulation of markets in which we operate;
- the financial instability of, and the related inability or unwillingness to timely pay for our services by, national oil companies and other foreign customers resulting from, and/or exacerbated by, depressed oil prices;
- hostility from local populations, particularly in the Middle East;
- tenuous, unstable or hostile relationships between countries that are interconnected in our operations; and

- difficulties associated with compliance with a variety of laws and regulations governing international trade, including the Foreign Corrupt Practices Act.

To the extent that our international operations are affected by these unexpected and adverse foreign economic and political conditions, we may experience project disruptions and losses that could significantly reduce our revenues and profits.
Implementation and achievement of international growth objectives also may be impeded by political, social and economic uncertainties or unrest in countries in which we conduct operations or market or distribute our products. In addition, compliance with multiple, and potentially conflicting, international laws and regulations, import and export limitations, anti-corruption laws and exchange controls may be difficult, burdensome or expensive.
For example, we are subject to compliance with various laws and regulations, including the Foreign Corrupt Practices Act and similar anti-bribery laws, which generally prohibit companies and their intermediaries from making improper payments to officials for the purpose of obtaining or retaining business. While our employees and agents are required to comply with these laws, we cannot provide assurance that our internal policies, procedures and controls will always protect us from violations of these laws, despite our commitment to legal compliance and corporate ethics. The occurrence or allegation of these types of risks may adversely affect our business, performance, prospects, value, financial condition and results of operations.
Operational disruptions caused by political instability and conflict in the Middle East, South America, Europe and Asia could adversely impact our current operations and plans of expansion in these regions.
Our Corrosion Protection segment currently operates in the Middle East and South America, and our Infrastructure Solutions segment currently operates in Europe and Asia. Political instability and social unrest in the Middle East, South America, Europe and Asia (including export restrictions, trade and other sanctions, taxes, repatriations and nationalizations), as well as the potential for catastrophic events such as abrupt political change, terrorist acts and conflicts or wars in these and other regions may cause damage or disruption to the economy, financial markets and our current and prospective customers in the these regions. Political instability, conflicts and the potential for catastrophic events have contributed to, and will likely continue to contribute to, volatility in these regions, which could adversely affect our operations and operating results.
As a result of our operations in these regions, we are also exposed to certain other uncertainties not generally encountered in our U.S. operations, including those detailed in the risk factor immediately above.
Business operations could be adversely affected by terrorism.
The threat of, or actual acts of, terrorism may affect our operations around the world in unpredictable ways and may force an increase in security measures and cause disruptions in supplies and markets. If any of our facilities, including our manufacturing facilities, or if any of the projects we are working on, particularly in the energy and mining sector, were to be a direct target, or an indirect casualty, of an act of terrorism, our operations could be adversely affected. Corresponding instability in the financial markets as a result of terrorism also could adversely affect our ability to raise capital.
We have international operations that are subject to foreign economic uncertainties and foreign currency fluctuation.
Global financial and credit markets have been, and continue to be, unstable and unpredictable. For example, in June 2016 the United Kingdom voted to exit the European Union (commonly referred to as “Brexit”), which has created significant uncertainties affecting the economy and business operations, including our operations, in the United Kingdom and the European Union. While the United Kingdom is currently scheduled to depart the European Union on March 29, 2019, the terms of Brexit remain uncertain as the United Kingdom continues to negotiate the terms of its exit from the European Union and, as such, it is difficult to predict the effect of Brexit on our Company and our operations in the United Kingdom, including our operations in Northern Ireland and the Republic of Ireland, our manufacturing facility in Wellingborough, United Kingdom, which distributes liners to the European Union and elsewhere, and our manufacturing facility in Stockton-on-Tees, United Kingdom, which manufactures and distributes cathodic protection equipment worldwide. Brexit could, among other things, affect the legal and regulatory schemes to which our operations in the United Kingdom are subject, adversely affect trade between the United Kingdom and the European Union and continue to cause economic uncertainty. The instability of the markets and weakness of the economy could affect the demand for our services, the financial strength of our customers and suppliers, their ability or willingness to do business with us, our willingness to do business with them, and/or our suppliers’ and customers’ ability to fulfill their obligations to us and/or the ability of us, our customers or our suppliers to obtain credit. These

factors could adversely affect our operations, earnings and financial condition.
A significant portion of our contracts and revenues are denominated in foreign currencies, which may result in additional risk of fluctuating currency values and exchange rates, hard currency shortages and controls on currency exchange. Changes in the value of foreign currencies could increase our U.S. dollar costs for, or reduce our U.S. dollar revenues from, our foreign operations. Any increased costs or reduced revenues as a result of foreign currency fluctuations could affect our profits. For example, Brexit has resulted in a sharp decline in the value of the British Pound as compared to the U.S. dollar and other major currencies. If there is a significant strengthening of the U.S. dollar compared to the British pound, Euro, the Canadian dollar or the Australian dollar, it may adversely affect our operating results and financial condition.

New tariffs and other trade restrictions may adversely affect our business and results of operations.

Certain of our businesses use, or depend on our customers' access to, steel products, including steel pipe, that may be imported into the United States from international markets. In 2018, the Trump Administration imposed certain new tariffs on, among other things, steel products. These tariffs have increased prices for imported steel products and have led domestic sellers to respond with market-based increases. In response, certain other countries have proposed responsive tariffs or other trade restrictions on U.S. products.

These new tariffs and trade restrictions, along with any additional tariffs and restrictions that may be implemented by the United States or other countries in the future, may result in further increased prices, decreased available supply of steel and other materials used in our business and decreased demand for U.S. products internationally. We may not be able to pass any resulting price increase on to our customers. Further, we, or our customers, may be unable to secure adequate supplies of steel or other materials on a timely basis, which may reduce demand for our products and services. As a result, our business and results of operations may be adversely affected.

An inability to attract and retain qualified personnel, and in particular, engineers, estimators, project managers, line workers, skilled craft workers and other experienced professionals, could impact our ability to perform on our contracts, which could harm our business and impair our future revenues and profitability.

Our ability to attract and retain qualified engineers, estimators, project managers, line workers, skilled craft workers and other experienced professionals in accordance with our needs is an important factor in our ability to maintain profitability and grow our business. The market for these professionals is competitive, particularly during periods of economic growth when the supply is limited. We cannot provide any assurance that we will be successful in our efforts to retain or attract qualified personnel when needed. Therefore, when we anticipate or experience growing demand for our services, we may incur additional cost to maintain a professional staff in excess of our current contract needs in an effort to have sufficient qualified personnel available to address this anticipated demand. If we do incur additional compensation and benefit costs, our customer contracts may not allow us to pass through these costs. We may recruit skilled professionals from other countries to work in the U.S., and from the U.S. and other countries to work abroad. Limitations imposed by immigration laws in the U.S. and abroad, travel bans, and difficulties obtaining visas and other restrictions on international travel could hinder our ability to attract necessary qualified personnel and harm our business and future operating results.

Competent and experienced engineers, project managers and craft workers are especially critical to the profitable performance of our contracts, particularly on our fixed-price contracts where superior design or execution of the project can result in profits greater than originally estimated or where inferior design or project execution can reduce or eliminate estimated profits or even result in a loss. Our project managers are involved in most aspects of contracting and contract execution including:

- supervising the bidding process, including providing estimates of significant cost components, such as material and equipment needs, and the size, productivity and composition of the workforce;
- negotiating contracts;
- supervising project performance, including performance by our employees, subcontractors and other third-party suppliers and vendors;
- estimating costs for completion of contracts that is used to estimate amounts that can be reported as revenues and earnings on the contract under the percentage-of-completion method of accounting;
- negotiating requests for change orders and the final terms of approved change orders; and
- determining and documenting claims by us for increased costs incurred due to the failure of customers, subcontractors and other third-party suppliers of equipment and materials to perform on a timely basis and in accordance with contract terms.

The California Refinery Safety Law, which requires owners and operators to use only building trade union contractors for covered work at the refineries (if not self-performed), has the potential to reduce, constrict or disrupt the entire labor pool for refinery maintenance in California by: (i) eliminating the non-union workforce; and (ii) requiring the use of the same workforce that also performs public works and general construction in California. This could adversely affect staffing for large turnaround projects at California refineries. This could also adversely affect Energy Services' ability to support turnaround and project work outside California, due to its past reliance on its mobile

California workforce to staff short term projects throughout the West Coast. There will be a significant wage differential between high union wages in California and wages in other states on the West Coast, creating a large disincentive for the California workforce to leave the state. The uncertainty created by this industry workforce change has the potential to negatively impact the entire West Coast refinery labor market, which in turn would negatively impact our revenues, profits and operations.

In addition, we use a multi-level sales force structured around target markets and key accounts, focusing on marketing our products and services to engineers, consultants, administrators, technical staff and elected officials. We are dependent on our personnel to continue to develop improvements to our proprietary processes, including materials used and the methods of manufacturing, installing, strengthening, coating and cathodic protection and we require quality field personnel to effectively and profitably perform our work. Our success in attracting and retaining qualified personnel is dependent on the resources available in individual geographic areas and the impact on the labor supply of general economic conditions, as well as our ability to provide a competitive compensation package and work environment. Our failure to attract, train, integrate, engage and retain qualified personnel could have a significant effect on our financial condition and results of operations.

Our profitability could be negatively impacted if we are not able to maintain appropriate utilization of our workforce.

The extent to which we utilize our workforce affects our profitability. If we under-utilize our workforce, our project gross margins and overall profitability suffer in the short term. If we over-utilize our workforce, we may also negatively impact margins and overall profitability, as well as safety, employee satisfaction and project execution, which could result in an increase in injuries to our employees and a decline of future project awards. The utilization of our workforce is impacted by numerous factors including:

- our estimate of the headcount requirements for various units based on our forecast of the demand for our products and services;
- our ability to maintain our talent base and manage attrition;
- our ability to schedule our portfolio of projects to efficiently utilize our employees and minimize downtime between project assignments; and
- our need to invest time and resources into functions such as training, business development, employee recruiting, and sales that are not chargeable to customer projects.

Our business may be adversely impacted by work stoppages, staffing shortages and other labor matters.

As of December 31, 2018, our Aegion Energy Services business had approximately 1,370 employees that were represented by unions, although these numbers are constantly changing as customer demands change. Infrastructure Solutions has approximately 130 employees represented by unions. Although we believe that our relations with our employees and the unions are good, no assurances can be made that we will not experience these and other types of conflicts with labor unions, works councils, other groups representing employees, or our employees in general, especially in the context of any future negotiations with our labor unions. We can also make no assurance that future negotiations with our labor unions will not result in a significant increase in the cost of labor. Approximately 70% of our Energy Services union employees currently participate in multi-employer benefit plans, which is a result of the transition of many of our clients to our building trade union contracting entity. The number of multi-employer plans in which our employees participate varies depending on how many local unions we are using at any particular time, but it is usually between 20 and 30 multi-employer plans. Participation in multi-employer benefit plans may result in liability to Aegion Energy Services in excess of that directly attributable to employees of Aegion Energy Services.

Additionally, the employees of some of our customers are unionized, especially the customers of our Aegion Energy Services business. Further, many of our customers' union contracts will be renegotiated in 2019. Any strikes, work stoppages or other labor matters experienced by our customers may impact our ability to work on projects and, as a result, have an adverse effect on our financial condition and results of operations.

Finally, in certain areas of our business, most notably in our Corrosion Protection platform, our employees are not represented by unions. As a result, we may not be eligible to bid or perform certain work that requires union labor, which may have an adverse effect on our financial condition and results of operations.

The revenues from the water and wastewater portion of our Infrastructure Solutions platform are substantially dependent on municipal government spending.

Many of our customers are municipal governmental agencies and, as such, we are dependent on municipal spending. Spending by our municipal customers can be affected by local political circumstances, budgetary constraints and other factors. Consequently, future municipal spending may not be allocated to projects that would benefit our business or may not be allocated in the amounts or for the size of the projects that we anticipated. A decrease in municipal spending on such projects would adversely impact our revenues, results of operations and cash flows.

The loss of one or more of our significant customers could adversely affect us.

One or more customers have in the past and may in the future contribute a material portion of our revenues in any one year. Because these significant customers generally contract with us for specific projects or for specific periods of time, we may lose these customers from year to year as the projects or maintenance contracts are completed. The loss of business from any one of these customers could have a material adverse effect on our business or results of operations.

The execution of our growth strategy is dependent upon the continued availability of third-party financing arrangements for our customers.

Tighter credit markets could adversely affect our customers' ability to secure the financing necessary to proceed or continue with pipe or other infrastructure installation, rehabilitation, strengthening, coating and cathodic protection projects. Our customers' or potential customers' inability to secure financing for projects could result in the delay, cancellation or downsizing of new projects or the suspension of projects already under contract, which could cause a decline in the demand for our services and negatively impact our revenues and earnings.

A substantial portion of our raw materials is from a limited number of vendors, and we are subject to market fluctuations in the prices of certain commodities.

The primary products and raw materials used by our Corrpro operations include zinc, aluminum, magnesium and other metallic anodes, as well as wire and cable. We believe that Corrpro has multiple sources available for these raw materials and is not dependent on any single vendor to meet its supply needs. However, the prices of these raw materials have historically been affected by the prices of energy, petroleum, steel and other commodities, tariffs and duties on imported materials and foreign currency and exchange rates. A significant increase in the prices of these raw materials could adversely affect our results of operations.

We purchase the majority of our fiber requirements for Insituform® tube manufacturing from two sources. We believe, however, that alternate sources are readily available, and we continue to negotiate with other supply sources. The manufacture of the Insituform® tubes used in our water and wastewater pipeline rehabilitation business is dependent upon the availability of resin, a petroleum-based product. We currently have qualified seven resin suppliers from which we intend to purchase the majority of our resin requirements for our North American operations. For our European operations, we currently have qualified six resin suppliers, and we currently have qualified six resin suppliers for our Asia-Pacific operations. We believe that these and other sources of resin supply are readily available. Historically, resin prices have fluctuated on the basis of the prevailing prices of its inputs, including styrene and oil. We anticipate that prices will continue to be heavily influenced by the events affecting these inputs, including the oil market. If there is a shortage or contraction of fiber or resin suppliers or if the price of fiber or resin increase, it could have an adverse effect on our results of operations.

The primary products and raw materials used in the manufacture of our FRP composite systems are carbon, glass, resins, fabric and epoxy raw materials. Carbon and epoxies are the largest materials purchased, which are currently purchased through a select group of suppliers, although we believe these and the other materials are available from a number of vendors. The price of epoxy historically is affected by the price of oil. In addition, a number of factors such as worldwide demand, labor costs, energy costs, import duties and other trade restrictions may influence the price of these raw materials. An increase in the price of these raw materials may have an adverse effect on our operations.

Further, because we utilize a limited number of extruders to manufacture our Fusible PVC® pipe products, we could be adversely affected if one or more of these extruders is unable to continue to manufacture our Fusible PVC® pipe products.

We also purchase a significant volume of fuel to operate our trucks and equipment. At present, we do not engage in any type of hedging activities to mitigate the risks of fluctuating market prices for oil or fuel. A significant increase in the price of oil could cause an adverse effect on our cost structure that we may not be able to recover from our customers.

We may become involved in legal proceedings, which will increase our costs and, if adversely determined, could have a material effect on our financial condition, results of operations, cash flows and liquidity.

As a result of the type of work we do, namely construction, we may become engaged in legal proceedings arising from the operation of our business, including being named as a defendant in future actions. Such actions against us may arise out of the normal course of performing services on project sites, and include workers' compensation claims, personal injury claims and contract disputes with our customers. From time to time, we may also be named as a defendant for actions involving the violation of federal and state labor laws related to employment practices, wages and benefits. We may also be a plaintiff in legal proceedings against customers seeking to recover wages and benefits or seeking to recover payment of contractual amounts due to us. Further, we may make claims against customers for increased costs incurred by us resulting from, among other things, services performed by us at the request of a

customer that are in excess of original project scope that are later disputed by the customer and customer-caused delays in our contract performance.
We maintain insurance against operating hazards in amounts that we believe are customary in our industry. However, in some instances we are self-insured and in other instances our insurance policies include deductibles and certain coverage exclusions, so we cannot provide assurance that we are adequately insured against all of the risks associated with the conduct of our business. A successful claim brought against us in excess of, or outside of, our insurance coverage could have a material adverse effect on our financial condition, results of operations, cash flows and liquidity.

Litigation, regardless of its outcome, is expensive, typically diverts the efforts of our management away from operations for varying periods of time, and can disrupt or otherwise adversely impact our relationships with current or potential customers, subcontractors and suppliers. Payment and claim disputes with customers may also cause us to incur increased interest costs resulting from incurring indebtedness under our revolving line of credit or receiving less interest income resulting from fewer funds invested due to the failure to receive payment for disputed claims and accounts.

Extreme weather conditions may adversely affect our operations.

We are likely to be impacted by weather extremes, such as excessive rain or hurricanes, tornadoes, typhoons, snow and ice or frigid temperatures, which may cause temporary, short-term anomalies in our operational performance in certain localized geographic regions. Our Infrastructure Solutions and Corrosion Protection segments are particularly sensitive to weather extremes. Delays and other weather impacts could adversely affect our ability to meet project deadlines and may increase a project's cost and decrease its profitability.

Certain of our facilities are located in regions that may be affected by natural disasters.

We have multiple facilities in and around the U.S. Gulf Coast, including facilities near Houston, Texas, and in Florida. These regions are subject to increased hurricane activity that can result in substantial flooding. Our Aegion Energy Services business serves large oil and gas customers in California and is headquartered in Irvine, California. Furthermore, our Infrastructure Solutions segment has substantial operations in California. Historically, California has been susceptible to natural disasters, such as earthquakes, drought, floods and wildfires. Although we maintain loss insurance where necessary, a hurricane, earthquake, wildfire or other natural disaster could result in significant damage to our facilities, destruction or disruption of our critical business or information technology systems, recovery costs and interruption to certain of our operations. In addition, a catastrophic event could interrupt operations of our customers and suppliers, which could result in delays or cancellation of customer orders, the loss of customers, and impediments to the manufacture or shipment of products or execution of projects, which could result in loss of business or an increase in expense, both of which may have a material adverse effect on our business. In the specific case of wildfires, an accusation or ultimate determination that our operations were the cause of a wildfire may also have a material adverse effect on our business.

The actual timing, costs and benefits of the 2017 Restructuring may differ from those currently expected, which may reduce our operating results.

On July 28, 2017, we introduced the 2017 Restructuring and, through several additional actions during 2018, expanded the scope of the restructuring to include many of our operations around the world. The restructuring is intended to reduce complexity and risk in our business operations, eliminate losses from underperforming businesses and also significantly reduce our consolidated annual operating expenses. We completed much of the 2017 Restructuring during 2017 and 2018 and expect to substantially complete the 2017 Restructuring during 2019. See Notes 1 and 4 to the consolidated financial statements contained in this report for additional information and disclosures regarding our restructuring activities.

The 2017 Restructuring is subject to various risks, which could result in the actual timing, costs and benefits of the plan differing from those currently anticipated. These risks and uncertainties include, among others, that: (i) we may not be able to implement the 2017 Restructuring in the timeframe currently planned; (ii) our costs related to the 2017 Restructuring may be higher than currently estimated; (iii) the expected annual expense reductions may be less than currently estimated; and (iv) unanticipated disruptions to our operations may result in additional costs being incurred. Because of these and other factors, we cannot predict whether we will realize the purpose and anticipated benefits of the 2017 Restructuring, and if we do not, our business and results of operations may be adversely impacted. We also cannot provide assurance that we will not undertake additional restructuring activities in the future.

Additionally, the 2017 Restructuring may yield unintended consequences, such as:

- actual or perceived disruption of service or reduction in service standards to customers;
- the failure to preserve supplier relationships and distribution, sales and other important relationships and to resolve conflicts that may arise;
- attrition beyond our intended reduction in headcount and reduced employee morale, which may cause our employees who were not affected by the 2017 Restructuring to seek alternate employment;

- increased risk of employment litigation; and
- diversion of management attention from ongoing business activities.

Divestitures and discontinued operations could negatively impact our business, and retained liabilities from businesses that we sell could adversely affect our financial results.

As part of our portfolio management process, we review our operations for businesses, which may no longer be aligned with our strategic initiatives and long-term objectives. For example, as part of our 2017 Restructuring discussed above in

"Strategic Initiative and Key Divestitures", we have recently or are in the process of divesting or otherwise exiting multiple businesses. We also continue to review our portfolio and may pursue additional divestitures. Divestitures pose risks and challenges that could negatively impact our business, including required separation or carve-out activities and costs, disputes with buyers or potential impairment charges. We may also dispose of a business at a price or on terms that are less than we had previously anticipated. After reaching an agreement with a buyer for the disposition of a business, we are also subject to the satisfaction of pre-closing conditions, as well as necessary contractual counter-party, regulatory and governmental approvals or consents on acceptable terms, which may prevent us from completing a transaction. Dispositions may also involve continued financial involvement, as we may be required to retain responsibility for, or agree to indemnify buyers against contingent liabilities related to a business sold, such as lawsuits, tax liabilities, lease payments, product liability claims or environmental matters. Under these types of arrangements, performance by the divested businesses or other conditions outside of our control could affect future financial results.

If we do not realize the expected benefits or synergies of any divestiture transaction, our consolidated financial position, results of operations and cash flows could be negatively impacted. Any divestiture may result in a dilutive impact to our future earnings if we are unable to offset the dilutive impact from the loss of revenue associated with the divestiture, as well as significant write-offs, including those related to goodwill and other intangible assets, which could have a material adverse effect on our results of operations and financial condition.

We may from time to time undertake internal reorganizations that may adversely impact our business and results of operations.

From time to time, including in 2019, in an effort to simplify our organizational structure and streamline our operations or for other operational reasons, we may undertake certain internal reorganizations that may involve, among other things, the combination or dissolution of certain of our existing subsidiaries, the creation of new subsidiaries and business divisions and the settlement of historical inter-company transactions. Additionally, as a result of the enactment of the TCJA and its effect on the taxation of offshore earnings, in connection with these actions or our operations generally, we may determine to repatriate certain earnings from our international subsidiaries, which earnings were previously permanently reinvested in such subsidiaries' operations. In undertaking such actions, we consider, among other things, the alignment of our corporate structure with our organizational objectives, the operational and tax efficiency of our corporate structure and the long-term cash flow needs of our business. These efforts may not result in the intended or expected benefits, may result in disruptions to our business and may cause the Company to incur additional expenses or tax liabilities. Accordingly, such actions may adversely impact our business and results of operations.

Changes in the industries within which we operate and market conditions could lead to charges related to discontinuances of certain of our businesses, asset impairment, workforce reductions or restructurings.

In response to changes in industry and market conditions, we may be required to strategically realign our resources and to consider restructuring, disposing of or otherwise exiting businesses. Any resource realignment, or decision to limit investment in or dispose of or otherwise exit businesses, may result in the recording of special charges, such as asset write-offs, workforce reductions, restructuring costs or charges relating to consolidation of excess facilities or businesses. Our estimates with respect to the useful life or ultimate recoverability of our carrying basis of assets, including purchased intangible assets, could change as a result of such assessments and decisions. Further, our estimates relating to the liabilities for excess facilities are affected by changes in real estate market conditions.

We may incur impairments to goodwill or long-lived assets.

We review our long-lived assets, including goodwill and other intangible assets, for impairment annually or whenever events or changes in circumstances indicate that the carrying amount of these assets may not be recoverable. The valuation of goodwill and other intangible assets requires assumptions and estimates of many critical factors, including revenue and market growth, operating cash flows, market multiples and discount rates. Negative industry or economic trends, including reduced market prices of our common stock, reduced estimates of future cash flows, disruptions to our business, slower growth rates, or lack of growth in our relevant businesses, could lead to further impairment charges against our long-lived assets, including goodwill and other intangible assets. If, in any period, our stock price decreases to the point where our fair value, as determined by our market capitalization, is less than the book value of our assets for an extended period of time, this could also indicate a potential impairment, and we may be required to record an impairment charge in that period, which could adversely affect our results of operations.

We may be subject to information technology system failures, network disruptions, cybersecurity attacks and breaches in data security, which could disrupt our operations and could result in a loss of assets.

In the ordinary course of our business, we collect and store sensitive data, including intellectual property, proprietary business information, and personally identifiable information of our customers, suppliers, employees and other individuals. In storing and managing this information, we rely upon multiple information technology systems and networks, some of which are web-based or managed by third parties, to process, transmit and store electronic information and to manage or support a variety of critical business processes and activities. The secure and consistent operation of these systems, networks and processes is critical to our business operations. Our systems and networks have been, and will continue to be, the target of cybersecurity threats, such as botnets, distributed denial-of-service attacks, malware, ransomware, phishing, viruses, spoofing and other cyber-security incidents that could result in the unauthorized release, gathering, monitoring, use, loss or destruction of our customers', suppliers' or employees' sensitive and personal data. Successful cyber-attacks or other data breaches, as well as risks associated with compliance with applicable data privacy laws, could harm our reputation, divert management attention and resources, increase our operating expenses due to the employment of consultants and third party experts and the purchase of additional infrastructure, and/or subject us to legal or regulatory liability, resulting in increased costs and loss of revenue.

While we proactively safeguard our data and are continuously enhancing our security software and controls, the increase in frequency and sophistication of cyber-attacks may result in our security controls and practices and business continuity plans being ineffective in anticipating, preventing and effectively responding to all potential cyber-risk exposures. Further, data privacy is subject to frequently changing rules and regulations, which are not uniform and may possibly conflict in jurisdictions and countries where we provide services. Our failure to adhere to or successfully implement processes in response to changing regulatory requirements in this area could result in legal liability or impairment to our reputation in the marketplace.

Additionally, our employees and certain of our third-party service providers may have access or exposure to sensitive customer data and systems. The misuse or unauthorized disclosure of information could result in contractual and legal liability for us due to the actions or inactions of our employees or vendors.

To improve the effectiveness of our operations and to interface with our customers and suppliers, we use our customers' or suppliers' information technology systems to submit and process invoices and payments. The failures of these systems could disrupt our operations by causing transaction errors, processing inefficiencies, delays or cancellation of customer orders, impediments to the manufacture or shipment of products and other business disruptions. These events could lead to financial losses from loss of business or an increase in expense, all of which may have a material adverse effect on our business.

Increasing regulatory focus on privacy issues and expanding laws could expose us to increased liability.

In May 2018, the European Union's new General Data Protection Regulation replaced the existing European Union Data Protection Directive, and has had a significant impact on how businesses can collect and process the personal data of European Union individuals, including the requirement for business to self-report personal data breaches to the relevant supervisory authority and, under certain circumstances, to the affected data subjects, and provide additional rights to individuals whose data is processed. Penalties for non-compliance are also significantly higher under the new law, with the maximum fine being the higher of €20 million or 4% of global turnover for the preceding year. More than 5% of our workforce as of December 31, 2018 was employed in the European Union. In addition, numerous proposals regarding privacy and data protection are pending before U.S. and non-U.S. legislative and regulatory bodies. Despite our commitment to complying with applicable laws, actual or alleged violations of these laws could result in legal claims or proceedings and regulatory penalties, which could disrupt our business, distract our employees and negatively impact our reputation as well as our results of operations. These rules and regulations may not be uniform and may possibly conflict in jurisdictions and countries where we conduct business. Our failure to adhere to or successfully implement processes in response to changing regulatory requirements in this area could result in legal liability or impairment to our reputation in the marketplace.

We are subject to a number of restrictive debt covenants under our credit facility.

In October 2015, the Company amended and restated its $650.0 million senior secured credit facility, followed by subsequent amendments in February 2018 and December 2018, (the "amended Credit Facility") with a syndicate of banks. Our amended Credit Facility contains certain restrictive covenants, which restrict our ability to, among other things, incur additional indebtedness, incur certain liens on our assets or sell assets, make investments and make other restricted payments. Our amended Credit Facility also requires us to maintain specified financial ratios under certain conditions and satisfy financial condition tests. Our ability to meet those financial ratios and tests and otherwise comply with our financial covenants may be affected by the factors described in this "Risk Factors" section of this

Report and other factors outside our control, and we may not be able to continue to meet those ratios, tests and covenants. Our ability to generate sufficient cash from operations to meet our debt obligations will depend upon our future operating performance, which will be affected by general economic, financial, competitive, business and other factors beyond our control. A breach of any of these covenants, ratios, tests or restrictions, as applicable, or any inability to pay interest on, or principal of, our outstanding debt as it becomes due could result in an event of default. Upon an event of default, if not waived by our lenders, our lenders may declare all amounts outstanding as due and payable.

At December 31, 2018, we were in compliance with all of our debt covenants as required under the amended Credit Facility. If we are unable to comply with the restrictive covenants in the future, we would be required to obtain amendments or waivers from our lenders or secure another source of financing. If our current lenders accelerate the maturity of our indebtedness, we may not have sufficient capital available at that time to pay the amounts due to our lenders on a timely basis.

In addition, these restrictive covenants may prevent us from engaging in transactions that benefit us, including responding to changing business and economic conditions and taking advantage of attractive business opportunities.
We occasionally access the financial markets to finance a portion of our working capital requirements and support our liquidity needs. Our ability to access these markets may be adversely affected by factors beyond our control and could negatively impact our ability to finance our operations, meet certain obligations or implement our operating strategy.
We occasionally borrow under our existing credit facility to fund operations, including working capital investments. Market disruptions such as those experienced in the United States and abroad in the past few years have materially impacted liquidity in the credit and debt markets, making financing terms for borrowers less attractive and, in certain cases, resulting in the unavailability of certain types of financing. Uncertainty in the financial markets may negatively impact our ability to access additional financing or to refinance our existing credit facility or existing debt arrangements on favorable terms or at all, which could negatively affect our ability to fund current and future expansion as well as future acquisitions and development. These disruptions may include turmoil in the financial services industry, volatility in the markets where our outstanding securities trade and general economic downturns in the areas where we do business. If we are unable to access funds at competitive rates, or if our short-term or long-term borrowing costs increase, our ability to finance our operations, meet our short-term obligations and implement our operating strategy could be adversely affected.
As a holding company, Aegion depends on its operating subsidiaries to meet its financial obligations.
Aegion Corporation is a holding company with no significant operating assets. Our subsidiaries conduct all of our operations and own substantially all of our assets. Our cash flow and our ability to meet our obligations depends on the cash flow of our subsidiaries. In addition, the payments of funds in the form of dividends, intercompany payments, tax sharing payments and other forms may be subject to restrictions under the laws of the states and countries in which we operate.
The market price of our common stock is highly volatile and may result in investors selling shares of our common stock at a loss.
The trading price of our common stock is highly volatile and subject to wide fluctuations in price in response to various factors, many of which are beyond our control, including:
- actual or anticipated variations in quarterly operating results;
- changes in financial estimates by securities analysts that cover our stock or our failure to meet these estimates;
- conditions or trends in the U.S. wastewater rehabilitation market;
- conditions or trends in mined materials, oil and natural gas markets;
- changes in municipal and corporate spending practices;
- a downturn of the municipal bond market or lending markets generally;
- changes in the federal or state governments that impact regulation and spending regarding energy and infrastructure;
- changes in market valuations of other companies operating in our industries;
- announcements by us or our competitors of a significant acquisition or divestiture; and
- additions or departures of key personnel.

In addition, the stock market in general and The Nasdaq Global Select Market in particular have experienced extreme price and volume fluctuations that may be unrelated or disproportionate to the operating performance of listed companies. Industry factors may seriously harm the market price of our common stock, regardless of our operating performance. Such stock price volatility could result in investors selling shares of our common stock at a loss.
Future sales of our common stock or equity-linked securities in the public market could adversely affect the trading price of our common stock and our ability to raise funds in new stock offerings.
Sales of substantial numbers of additional shares of our common stock or any shares of our preferred stock, including sales of shares in connection with any future acquisitions, or the perception that such sales could occur, may have a harmful effect on prevailing market prices for our common stock and our ability to raise additional capital in the financial markets at a time and price favorable to us. We may issue equity securities in the future for a number of reasons, including to finance our operations and business strategy, to adjust our ratio of debt to equity, to satisfy obligations upon exercise of outstanding warrants or options or for other reasons. Our certificate of incorporation provides that we have authority to issue 125,000,000 shares of common stock. As of December 31, 2018, 31,922,409

shares of common stock were issued and outstanding.

Provisions in our certificate of incorporation could make it more difficult for a third party to acquire us or could adversely affect the rights of holders of our common stock or the market price of our common stock.

Our certificate of incorporation provides that our board of directors has the authority, without any action of our stockholders, to issue up to 2,000,000 shares of preferred stock. Preferred stock may be issued upon such terms and with such

designations as our board of directors may fix in its discretion, including with respect to: (i) the payment of dividends upon our liquidation, dissolution or winding up; (ii) voting rights that dilute the voting power of our common stock; (iii) dividend rates; (iv) redemption or conversion rights; (v) liquidation preferences; or (vi) voting rights.
In addition, our certificate of incorporation provides that subject to the rights of the holders of any class or series of preferred stock set forth in our certificate of incorporation, the certificate of designation relating to such class or series of preferred stock, or as otherwise required by law, any stockholder action may be taken only at a meeting of stockholders and may not be effected by any written consent by such stockholders. The affirmative vote of the holders of at least 80% of the capital stock entitled to vote for the election of directors is required to amend, repeal or adopt any provision inconsistent with such arrangement.
These provisions could potentially be used to discourage attempts by others to obtain control of our company through merger, tender offer, proxy, consent or otherwise by making such attempts more difficult or more costly, even if the offer may be considered beneficial by our stockholders. These provisions also may make it more difficult for stockholders to take action opposed by our board of directors or otherwise adversely affect the rights of holders of our common stock or the market price of our common stock.
Our amended and restated by-laws designate the state courts of Delaware or, if no such state court has jurisdiction, the federal court for the District of Delaware, as the sole and exclusive forum for certain types of claims that may be initiated by our stockholders, which could discourage lawsuits against Aegion and Aegion's directors and officers.
Our amended and restated by-laws provide that, unless waived by Aegion, the state courts of the State of Delaware or, if no state court located in the State of Delaware has jurisdiction, the federal court for the District of Delaware, will be the sole and exclusive forum for any claims brought by a stockholder (including a beneficial owner) (i) that are based upon a violation of a duty by a current or former director, officer or stockholder in such capacity or (ii) as to which the Delaware General Corporation Law confers jurisdiction upon the Delaware Court of Chancery. This exclusive forum provision may limit the ability of our stockholders to bring a claim in a judicial forum that such stockholders find favorable for disputes with Aegion or Aegion's directors or officers, which may discourage such lawsuits against Aegion and Aegion's directors and officers. Alternatively, if a court outside of Delaware were to find this exclusive forum provision inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings described above, we could incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business, financial condition or results of operations.
We do not intend to pay cash dividends on our common stock in the foreseeable future.
We do not anticipate paying cash dividends on our common stock in the foreseeable future. Our present policy is to retain earnings to provide for the operation and expansion of our business or for the repurchase of shares of our common stock. Any payment of cash dividends will depend upon our earnings, financial condition, cash flows, financing agreements and other factors deemed relevant by our board of directors. Furthermore, under the terms of certain debt arrangements to which we are a party, we are subject to certain limitations on paying dividends. However, we carefully review this policy regularly and could initiate dividends in the future depending on appropriate circumstances.

Item 1B. Unresolved Staff Comments.
None.
Item 2. Properties.
We own our executive offices located in Chesterfield, Missouri, a suburb of St. Louis, at 17988 Edison Avenue. We also own our research and development and training facilities in Chesterfield.
Insituform Technologies, LLC owns a liner manufacturing facility and a contiguous felt manufacturing facility in Batesville, Mississippi. Insituform Linings Limited, our United Kingdom manufacturing company, owns certain premises in Wellingborough, United Kingdom, where its felt liner manufacturing facility is located and leases a facility for its glass liner manufacturing.
Underground Solutions, our wholly-owned subsidiary, leases office and warehouse space in California and Pennsylvania, and also leases pipe storage space in North Dakota and South Carolina.

Fyfe Co. and Fibrwrap Construction Services, our wholly-owned subsidiaries, lease an office in San Diego, California.

Corrpro, our wholly-owned subsidiary, owns certain office and warehouse space in Medina, Ohio as well as a manufacturing and warehouse facility in Sands Springs, Oklahoma. Its subsidiary, Corrpro Canada, Inc., also owns certain

premises in Edmonton, Alberta, Canada used for office and warehouse space. In addition, our Corrpro subsidiary in the United Kingdom, Corrpro Companies Europe Ltd., owns an office and production facility in Stockton-on-Tees, United Kingdom.
Our wholly-owned subsidiary, United Pipeline Systems, Inc., owns an office and shop facility as well as additional property in Durango, Colorado. In addition, our wholly-owned Canadian subsidiary, United Pipeline Systems Limited, owns an operating facility in Edmonton, Alberta, Canada for office space and manufacturing.
ACS, another wholly-owned subsidiary, owns certain premises in Conroe, Texas that are used as office space and operational facilities and leases certain premises in Tulsa, Oklahoma that are also used as office space and operational facilities.
Our wholly-owned subsidiary, Aegion Energy Services, leases an office in Irvine, California for its headquarters and also leases various operational facilities throughout California as well as in Washington and Texas.
We own or lease various other operational facilities in the United States, Canada, Europe, South America, Asia-Pacific and the Middle East, and the foregoing facilities are regarded by management as adequate for the current requirements of our business.

Item 3. Legal Proceedings.

We are involved in certain actions incidental to the conduct of our business and affairs. Management, after consultation with legal counsel, does not believe that the outcome of any such actions, individually and in the aggregate, will have a material adverse effect on our consolidated financial condition, results of operations or cash flows.

Item 4. Mine Safety Disclosure.

Information 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 SEC Regulation S-K is included in Exhibit 95 to this annual report on Form 10-K.

Item 4A. Executive Officers of the Registrant.

Our executive officers, and their respective ages and positions with us, are as follows:

Charles R. Gordon	61	President and Chief Executive Officer
David F. Morris	57	Executive Vice President and Chief Financial Officer
Stephen P. Callahan	52	Senior Vice President, Human Resources
Mark A. Menghini	46	Senior Vice President, General Counsel and Secretary
Kenneth L. Young	67	Senior Vice President, Corporate Controller, Chief Accounting Officer and Treasurer

Charles R. Gordon serves as our President and Chief Executive Officer, a position he has held since October 2014. Mr. Gordon had been serving as our interim Chief Executive Officer since May 2014 and has served on our board of directors since 2009. Prior to serving as interim Chief Executive Officer of the Company, Mr. Gordon served as Chief Executive Officer of Natural Systems Utilities, LLC, a distributed water infrastructure company, from February 2014 to May 2014. Prior to Natural Systems Utilities, LLC, Mr. Gordon was President and Chief Operating Officer of Nuverra Environmental Solutions, Inc. (a holding company formerly known as Heckmann Corporation that buys and builds companies in the water sector) from November 2010 until his resignation in October 2013. Mr. Gordon was President and Chief Executive Officer of Siemens Water Technologies (a business unit of Siemens AG, a world leader in products, systems and services for water and wastewater treatment for industrial, institutional and municipal customers) from 2008 to 2010. Previously, Mr. Gordon served as Executive Vice President of the Siemens Water & Wastewater Systems Group from 2005 to 2008 and as Executive Vice President of the Siemens Water & Wastewater Services and Products Group from 2003 to 2005. His past experience also includes various management positions with US Filter Corporation and Arrowhead Industrial Water, prior to the acquisition of US Filter Corporation by the Siemens family of companies in 2004.
David F. Morris serves as our Executive Vice President and Chief Financial Officer, a position he has held since April 2018. Mr. Morris served as our Executive Vice President, Chief Administrative Officer, General Counsel and Secretary from October 2014 through April 2018 and as our interim Chief Financial Officer from November 2017

through April 2018. Mr. Morris served as our Vice President, General Counsel and Secretary beginning in January 2005 through April 2007, at which time he was promoted to Senior Vice President. Mr. Morris became our Chief Administrative Officer in August 2007. Mr. Morris was promoted to Executive Vice President in October 2014. From March 1993 until January 2005, Mr. Morris was an attorney with the law firm of Thompson Coburn LLP, St. Louis, Missouri, most recently as a partner in its corporate and securities practice areas.

Stephen P. Callahan serves as our Senior Vice President, Human Resources, a position he has held since November 2015. Prior to joining Aegion, Mr. Callahan was Vice President of Corporate and International Human Resources and HRIS at Peabody Energy from October 2010 until November 2015, where he was responsible for driving global alignment within the human resources function, HRIS, global mobility, business development support and M&A integration, HR metrics and analytics and corporate generalist support. Mr. Callahan has over 20 years of global experience working in Romania, India, France, China, Indonesia, Mongolia, Singapore and the United Kingdom.

Mr. Menghini serves as our Senior Vice President and General Counsel, a position he has held since May 2018. Mr. Menghini served as our Senior Vice President and Interim General Counsel from November 2017 through May 2018. Mr. Menghini served as our Senior Vice President and Deputy General Counsel from October 2014 through November 2017 and as our Vice President and Deputy General Counsel from December 2013 through October 2014. Prior to joining Aegion, Mr. Menghini was an officer and shareholder with the law firm of Greensfelder, Hemker & Gale, P.C., a regional law firm based in St. Louis, Missouri, where he practiced as a member of the firm's Construction Law Practice Group from 1998 until 2013.

Kenneth L. Young serves as our Senior Vice President, Corporate Controller, Chief Accounting Officer and Treasurer, a position he has held since December 2018. Mr. Young served as our Senior Vice President and Treasurer from October 2014 through December 2018, and as interim Corporate Controller from May to December 2018. Mr. Young served as our Vice President and Treasurer from April 2009 until October 2014. Prior to joining our Company in April 2009, he worked for Huttig Building Products, Inc., a building supply distributor, from 2005 to 2009, most recently serving as Chief Financial Officer, Secretary and Treasurer. Prior to that, he worked for MEMC Electronic Materials (now SunEdison Semiconductor) from 1989 to 2005, most recently serving as Corporate Treasurer.

PART II

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

Our common shares, $.01 par value, are traded on The Nasdaq Global Select Market under the symbol “AEGN”. During the quarter ended December 31, 2018, we did not offer any equity securities that were not registered under the Securities Act of 1933, as amended. As of February 25, 2019, the number of holders of record of our common stock was 385.

Holders of common stock are entitled to receive dividends as and when they may be declared by our board of directors. Our present policy is to retain earnings to provide for the operation and expansion of our business. However, our board of directors will review our dividend policy from time to time and will consider our earnings, financial condition, cash flows, financing agreements and other relevant factors in making determinations regarding future dividends, if any. Under the terms of our debt arrangement to which we are a party, we are subject to certain limitations on paying dividends. See “Management’s Discussion and Analysis of Financial Condition and Results of Operations – Liquidity and Capital Resources – Long-Term Debt” for further discussion of such limitations.

The following table provides information as of December 31, 2018 with respect to the shares of common stock that may be issued under our existing equity compensation plans:

Equity Compensation Plan Information

Plan Category	Number of securities to be issued upon exercise of outstanding options, warrants and rights (a)	Weighted-average exercise price of outstanding options, warrants and rights (b)	Number of securities remaining available for future issuance under equity compensation plans (excluding securities reflected in column (a)) (c)
Equity compensation plans approved by security holders [1]	1,483,338	$ 22.60	2,820,947
Equity compensation plans not approved by security holders	—	—	—
Total	1,483,338	$ 22.60	2,820,947

(1) The number of securities to be issued upon exercise of granted/awarded options, warrants and rights includes: (i) 52,783 stock options; (ii) 1,143,205 restricted stock, restricted stock units and restricted performance units; and (iii) 287,350 deferred stock units outstanding at December 31, 2018.

Issuer Purchases of Equity Securities

The following table provides information regarding repurchases made by us of our common stock during the year ended December 31, 2018, pursuant to share repurchase programs approved by our board of directors.

	Total Number of Shares (or Units) Purchased	Average Price Paid per Share (or Unit)	Total Number of Shares (or Units) Purchased as Part of Publicly Announced Plans or Programs	Maximum Number (or Approximate Dollar Value) of Shares (or Units) that May Yet Be Purchased Under the Plans or Programs
January 2018 (1) (2)	76,148	$25.61	69,300	$28,227,784
February 2018 (1) (2)	325,904	24.13	124,035	25,237,042
March 2018 (1) (2)	169,528	22.75	160,496	21,585,486
April 2018 (1) (2)	68,059	23.30	68,059	20,000,035
May 2018 (1) (2)	78,167	24.88	71,942	18,205,419
June 2018 (1) (2)	54,366	25.79	54,366	16,803,327
July 2018 (2)	726	25.69	—	16,803,327
August 2018	—	—	—	16,803,327
September 2018	—	—	—	16,803,327
October 2018	—	—		16,803,327
November 2018 (1) (2)	152,527	18.95	149,570	13,970,661
December 2018 (1) (2)	252,107	16.91	251,696	(3)
Total	1,177,532	$21.89	949,464	

(1) In October 2017, our board of directors authorized the open market repurchase of up to $40.0 million of our common stock to be made during 2018. That authorization was reduced to $30.0 million in 2018 in connection with an amendment to our Credit Facility. Any shares repurchased were pursuant to one or more 10b5-1 plans. We began repurchasing shares under this program in January 2018 and ceased on December 31, 2018 due to expiration of the program. Once repurchased, we promptly retired the shares.

(2) In connection with approval of our credit facility, our board of directors approved the purchase of up to $10.0 million of our common stock in each calendar year in connection with our equity compensation programs for employees and directors. The number of shares purchased includes shares surrendered to us to pay the exercise price and/or to satisfy tax withholding obligations in connection with "net, net" exercises of employee stock options and/or the vesting of restricted stock, restricted stock units or performance units issued to employees. During 2018, zero shares were surrendered in connection with stock swap transactions and 228,068 shares were surrendered in connection with restricted stock unit and performance unit transactions. The deemed price paid was the closing price of our common stock on the Nasdaq Global Select Market on the date that the restricted stock units or performance units vested. Once repurchased, we promptly retired the shares.

(3) In December 2018, our board of directors authorized the open market repurchase of up to two million shares of our common stock beginning January 1, 2019. Any shares repurchased will be pursuant to one or more 10b5-1 plans. The program will expire on the earlier of the repurchase by the Company of two million shares of common stock pursuant to the program or the board of directors' termination of the program. In December 2018, we amended our senior secured credit facility, which limits the open market repurchase of our common stock to be made during 2019 to $32.0 million.

Performance Graph

The following performance graph compares the total stockholder return on our common stock to the S&P 500 Index and a selected peer group index for the past five years. The compensation committee of our board of directors also reviews data for this peer group in establishing the compensation of our executive officers. In 2018, the peer group index was comprised of the following companies:

Actuant Corporation	Matrix Service Company
Barnes Group, Inc.	McDermott International Inc.
CIRCOR International, Inc.	Mistras Group, Inc.
Dril-Quip, Inc.	Newpark Resources, Inc.
Forum Energy Technologies, Inc.	Oil States International Inc.
Granite Construction Incorporated	Team, Inc.
Helix Energy Solutions Group, Inc.	Tetra Tech, Inc.
Kennametal, Inc.	Valmont Industries, Inc.
MasTec, Inc.	Willbros Group, Inc.

The graph assumes that $100 was invested in our common stock and each index on December 31, 2013 and that all dividends, if any, were reinvested.

Comparison of Five-Year Cumulative Return

	2013	2014	2015	2016	2017	2018
Aegion Corporation	$100.00	$85.02	$88.21	$108.27	$116.17	$74.55
S&P 500 Total Returns	100.00	113.69	115.26	129.05	157.22	150.33
Peer Group	100.00	78.45	59.17	85.22	89.48	63.51

Notwithstanding anything set forth in any of our previous filings under the Securities Act of 1933 or the Securities Exchange Act of 1934 which might incorporate future filings, including this Annual Report on Form 10-K, in whole or in part, the preceding performance graph shall not be deemed incorporated by reference into any such filings.

Item 6. Selected Financial Data.

The selected financial data set forth below has been derived from our consolidated financial statements contained in "Item 8. Financial Statements and Supplementary Data" of this Report and previously published historical financial statements not included in this Report. The selected financial data set forth below should be read in conjunction with "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our consolidated financial statements, including the footnotes, contained in this Report.

	Years Ended December 31,				
(In thousands, except per share amounts)	2018[(1)]	2017[(2)]	2016[(3)]	2015[(4)]	2014[(5)]
STATEMENT OF OPERATIONS DATA:					
Revenues	$1,333,568	$1,359,019	$1,221,920	$1,333,570	$1,331,421
Operating income (loss)	29,647	(43,520)	50,791	17,729	(20,715)
Income (loss) from continuing operations [(6)]	2,928	(69,401)	29,453	(10,284)	(34,223)
Loss from discontinued operations	—	—	—	—	(3,847)
Net income (loss) [(6)]	2,928	(69,401)	29,453	(10,284)	(38,070)
Basic earnings (loss) per share:					
Income (loss) from continuing operations [(6)]	0.09	(2.09)	0.85	(0.28)	(0.91)
Loss from discontinued operations	—	—	—	—	(0.10)
Net income (loss) [(6)]	0.09	(2.09)	0.85	(0.28)	(1.01)
Diluted earnings (loss) per share:					
Income (loss) from continuing operations [(6)]	0.09	(2.09)	0.84	(0.28)	(0.91)
Loss from discontinued operations	—	—	—	—	(0.10)
Net income (loss) [(6)]	0.09	(2.09)	0.84	(0.28)	(1.01)
BALANCE SHEET DATA:					
Cash and cash equivalents	$83,527	$105,717	$129,500	$209,253	$174,965
Working capital, net of cash	178,690	219,673	172,136	171,176	198,834
Current assets [(7)]	481,867	587,064	532,237	678,196	638,122
Property, plant and equipment, net	107,059	109,040	156,747	144,833	168,213
Goodwill	260,633	260,715	298,619	249,120	293,023
Identified intangible assets, net	119,696	132,345	194,911	174,118	182,273
Total assets [(7)]	992,417	1,107,099	1,193,582	1,254,013	1,291,133
Total long-term debt	311,472	344,795	370,620	351,128	372,935
Total liabilities [(7)]	522,230	602,043	617,399	659,457	646,048
Total stockholders' equity	462,737	494,246	568,500	578,025	626,635

---

(1) 2018 results include pre-tax charges of $29.5 million related to our restructuring efforts, $7.0 million in acquisition and divestiture expenses related primarily to our divestiture of Bayou and two small acquisitions, $2.8 million in non-cash charges related to estimates for inventory obsolescence, $2.2 million related to amending our Credit Facility and a $7.0 million loss on the sale of Bayou. Results also include a tax benefit of $1.9 million related to certain adjustments from the TCJA.

(2) 2017 results include pre-tax charges of $24.0 million related to our restructuring efforts, $86.4 million related to certain goodwill and definite-lived intangible asset impairments, and $3.1 million in acquisition and divestiture expenses related to our acquisition of Environmental Techniques and our planned divestiture of Bayou. Results also include tax expenses of $2.4 million related to impacts from the TCJA.

(3) 2016 results include pre-tax charges of $15.9 million related to our restructuring efforts and $2.7 million in acquisition expenses related to our acquisitions of Underground Solutions, Fyfe Europe, Concrete Solutions, LMJ and diligence on other targets. Results also include a pre-tax gain of $6.6 million in connection with the settlement of two longstanding lawsuits.

(4) 2015 results include pre-tax charges of $11.0 million related to our restructuring efforts, $43.5 million related to certain goodwill impairments, and $1.9 million in acquisition expenses related to our acquisitions of Schultz,

Underground Solutions and diligence on other targets. Results also include pre-tax charges of $3.4 million related to issuing our Credit Facility.

(5) 2014 results include pre-tax charges of $49.5 million related to our restructuring efforts, $52.7 million related to certain goodwill and definite-lived intangible asset impairments, and $1.4 million in acquisition expenses related to our acquisition of Brinderson and diligence on other targets. Results also include $4.5 million in pre-tax proceeds received in connection with the settlement of escrow claims related to the purchase of Brinderson.

(6) All periods presented include amounts attributable to Aegion Corporation.

(7) 2014 amounts also include certain components of discontinued operations.

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

Executive Summary
Aegion combines innovative technologies with market leading expertise to maintain, rehabilitate and strengthen pipelines and other infrastructure around the world. Since 1971, we have played a pioneering role in finding innovative solutions to rehabilitate aging infrastructure, primarily pipelines in the wastewater, water, energy, mining and refining industries. We also maintain the efficient operation of refineries and other industrial facilities and provide innovative solutions for the strengthening of buildings, bridges and other structures. We are committed to Stronger. Safer. Infrastructure®. We believe the depth and breadth of our products and services make us a leading provider for the world's infrastructure rehabilitation and protection needs.

Business Outlook
We believe a positive commercial outlook and the progress made over the last several years to simplify and position the Company in markets with favorable scale and earnings profiles will lead to modest earnings growth in 2019, despite a projected decline in consolidated revenues due to the lack of large project contributions during the year. Longer term, we believe our core businesses can generate annual revenue growth in the low to mid-single digit range, which should result in low double-digit annual earnings per share growth.
Infrastructure Solutions
One of the most attractive areas for growth is in the rehabilitation of municipal wastewater and pressure pipelines, primarily in North America. We offer a diverse portfolio of solutions in a highly fragmented and growing market. We made investments in 2018 to expand the use of Insituform® CIPP in several regions currently underserved by Insituform in the North American wastewater pipeline market. Outside North America, we also have an attractive market in Asia-Pacific for large-diameter pressure pipe strengthening, and we are continuing to pursue a strategy of growing third-party product sales around the globe. Our objective is to maintain growth and our share in a large and mature market through a continued focus on productivity and offering customer-driven solutions through technological differentiation.
Over the last few years, we completed a research and development effort that significantly reduced material and installation costs for the Tyfo® system while maintaining the superior material properties and quality of the technology. We also improved our InsituMain® CIPP technology to give customers a more robust solution. In 2019, we are focused on two key technology initiatives to serve the pressure pipe and wastewater rehabilitation business. We are in final development and field testing for a robotic system to mechanically and effectively seal the service connection between a CIPP pressurized water main line to residential lines into homes. Success with this development initiative could address a weak point in current commercially available small-diameter pressure pipe rehabilitation systems today. We also recently introduced the application of ultraviolet light technology to cure felt CIPP tubes, which has the potential to reduce the environmental and equipment footprint that is currently required for the curing process. Any new technology takes time to penetrate the market, but we believe both initiatives represent long-term growth levers for the segment.
Corrosion Protection
Nearly 50 percent of Corrosion Protection's revenues come from cathodic protection services for midstream oil and gas pipelines in North America, an attractive and growing market that we believe justifies further investment to outpace market growth. To that end, we continue to promote our new asset integrity management program for pipeline corrosion assessments. This new service improves data accuracy and processing efficiency, customizes the data transfer format (including geospatial mapping) and provides faster access to the information by customers. Corrosion Protection's pipeline assessment services are expected to create a multiplier effect for our other capabilities in direct pipeline assessments, engineering, cathodic protection system installation and pipeline corrosion remediation. Our objective is to expand the relationships with our top customers, who are the leading pipeline owners in North America, to accelerate revenue growth.
With oil prices trading in a more stable range, we have seen improved demand for our Tite Liner® lining pipeline protection system and our field pipe coatings applications, both in our North America market as well as overseas. We

are focused on capturing additional opportunities in the Middle East, where we see a robust sales funnel over the next several years as national energy companies look to increase production through multiple major onshore and offshore gas and oil field development and expansion projects.
Energy Services
We expect Energy Services to continue to build on the momentum achieved in 2018. The outlook for day-to-day downstream refinery maintenance remains robust based on long-term contracts and our position as the lead outsourced provider of maintenance services at 14 out of the 17 refineries on the United States West Coast. We have an effort underway to expand

our services to those customers in mechanical maintenance, turnaround service, electrical and instrumentation maintenance, scaffolding services and small capital construction activities.

Strategic Initiatives/Divestitures

2017 Restructuring

On July 28, 2017, our board of directors approved the 2017 Restructuring. As part of the 2017 Restructuring, we announced plans to: (i) divest our pipe coating and insulation businesses in Louisiana, The Bayou Companies, LLC and Bayou Wasco Insulation, LLC (collectively "Bayou"; (ii) exit all non-pipe related contract applications for the Tyfo® system in North America; (iii) right-size the cathodic protection services operation in Canada and the CIPP businesses in Australia and Denmark; and (iv) reduce corporate and other operating costs.

During 2018, our board of directors approved additional actions with respect to the 2017 Restructuring, which included the decisions to: (i) divest the Australia and Denmark CIPP businesses; (ii) take actions to further optimize operations within North America, including measures to reduce consolidated operating costs; and (iii) divest or otherwise exit multiple additional international businesses, including: (a) our cathodic protection installation activities in the Middle East, including Corrpower International Limited, our cathodic protection materials manufacturing and production joint venture in Saudi Arabia; (b) United Pipeline de Mexico S.A. de C.V., our Tite Liner® joint venture in Mexico; (c) our Tite Liner® businesses in Brazil and Argentina; (d) Aegion South Africa Proprietary Limited, our Tite Liner® and CIPP joint venture in the Republic of South Africa; and (e) our CIPP contract installation operations in England.

We divested our Bayou business in August 2018 and our Denmark CIPP business in November 2018. Discussions are underway with a prospective buyer for the sale of the Australia CIPP business. If discussions are successful, a transaction is expected to be completed during the first half of 2019. Planned divestitures or exits of the remaining international businesses noted above are expected to be substantially complete by June 30, 2019.

Total pre-tax 2017 Restructuring and related impairment charges since inception were $139.7 million ($125.9 million post-tax) and consisted of cash charges totaling $25.8 million and non-cash charges totaling $113.9 million. Cash charges included employee severance, retention, extension of benefits, employment assistance programs and other restructuring costs associated with the restructuring efforts described above. Non-cash charges included (i) $86.4 million related to goodwill and long-lived asset impairment charges recorded in 2017 as part of exiting the non-pipe FRP contracting market in North America, and (ii) $27.5 million related to allowances for accounts receivable, write-off of certain other current assets and long-lived assets, inventory write-offs, impairment of definite-lived intangible assets, as well as net losses on the disposal of both domestic and international entities. We reduced headcount by approximately 360 employees as a result of these actions.

We expect to incur additional cash and non-cash charges of $15 million to $19 million during 2019. The identified charges are primarily focused in the international operations of both Infrastructure Solutions and Corrosion Protection, but will also include certain charges in Energy Services to a lesser extent. We expect to reduce headcount by an additional 100 employees as a result of these further actions.

2016 Restructuring

During 2016, we completed our 2016 Restructuring, which: (i) reduced/eliminated Energy Services' upstream operations in California and in the Permian Basin in Texas; (ii) reduced Corrosion Protection's upstream exposure by divesting our interest in Bayou Perma-Pipe Canada, Ltd. ("BPPC"), our Canadian pipe coating joint venture; (iii) right-sized Corrosion Protection to compete more effectively; and (iv) reduced corporate and other operating costs. The 2016 Restructuring reduced consolidated annual operating costs by approximately $17.4 million, of which approximately $1.2 million, $6.6 million and $5.6 million related to recognized savings within Infrastructure Solutions, Corrosion Protection and Energy Services, respectively, and $4.0 million related to reduced corporate costs. Cost savings were achieved primarily through office closures and reducing headcount by 964 employees, or 15.5% of our total workforce as of December 31, 2015.

During 2016, we recorded pre-tax charges of $16.1 million ($10.3 million post-tax), most of which were cash charges, consisting primarily of employee severance, extension of benefits, early lease termination and other costs associated with the restructuring efforts as described above. We do not expect to incur any future charges related to the 2016

Restructuring.
See “Financial Statements and Supplementary Data” in Item 8 of this Report for further discussion regarding our recent strategic initiatives. See Note 4 to the consolidated financial statements contained in this Report for additional information on the charges related to our restructuring efforts.

Divestitures – Planned and Completed

Through our restructuring efforts to exit higher-risk, low return markets and streamline our operations, we have divested, or planned to divest, certain businesses in our Infrastructure Solutions and Corrosion Protection segments during 2018, 2017 and 2016:

i. On November 1, 2018, we sold substantially all of the fixed assets and inventory from our CIPP operations in Denmark. In connection with the sale, we entered into a five-year exclusive tube-supply agreement whereby the buyers will exclusively purchase our Insituform® CIPP liners. The buyers will also be entitled to use the Insituform® trade name based on a trademark license granted for the same five-year time period.

ii. On August 31, 2018, we sold substantially all of the assets of Bayou and our ownership interest in Bayou Wasco Insulation LLC, which collectively had been held for sale as part of the 2017 Restructuring and reflected our desire to reduce further our exposure in the North American upstream oil and gas markets.

iii. On May 14, 2018, our board of directors approved plans to divest the assets and liabilities of our CIPP operations in Australia. While restructuring actions in Australia led to year-over-year improvements in operating results in 2018, an assessment of the long-term fit within Aegion's portfolio led to the decision to divest the business. We are currently in discussions with a third party and, if those discussions are successful, we expect to close a transaction in the first half of 2019.

iv. In February 2016, we sold our fifty-one percent (51%) interest in BPPC to our joint venture partner, Perma-Pipe, Inc. BPPC served as our pipe coating and insulation operation in Canada. The sale of our interest in BPPC was part of a broader effort to reduce our exposure in the North American upstream market.

v. During the first quarter of 2019, we entered into discussions with prospective buyers regarding the sale of our interests in Corrpower International Limited and Aegion South Africa Proprietary Limited. If the discussions are successful, we expect to close the transactions in the first half of 2019.

See Notes 1 and 6 to the consolidated financial statements contained in this Report for additional information and disclosures regarding our divestitures.

Results of Operations

Overview

Revenues of $1.33 billion were generated in 2018, just 1.9% shy of record revenues reported in 2017, which were bolstered by a large deepwater project in our pipe coating and insulation operation within Corrosion Protection. Making up much of the difference in 2018 was our Energy Services segment, which drove revenue increases of more than 15%, and strong execution on large international coating services projects within Corrosion Protection.

Certain pockets of Corrosion Protection continued to experience upstream, and to a lesser extent midstream, market challenges mostly in our North American coating services and industrial linings operations as a result of recent and current oil prices. As part of our restructuring efforts to lower our exposure to the upstream market, on August 31, 2018, we completed the divestiture of our domestic pipe coating and insulation operation in New Iberia, Louisiana. Also in 2018, we expanded our effort to divest or otherwise exit non-performing international businesses, both within Infrastructure Solutions and Corrosion Protection.

Infrastructure Solutions experienced lower revenues in 2018 compared to record levels in 2017 primarily due to the exit of our structural FRP business in North America as well as lower productivity and an unfavorable mix in our CIPP business in North America. We also experienced continued negative impacts from our CIPP business in Denmark, which we sold during the fourth quarter of 2018. Partly offsetting these declines, Fusible PVC® sales grew significantly in 2018 as compared to 2017, driven by demand for pressure pipe offerings.

Energy Services grew revenues, primarily related to maintenance and construction activities, due to increased demand and the successful completion of several labor transitions at refineries to comply with labor laws in California.

We benefited from a lower effective tax rate in 2018 as a result of the Tax Cuts and Jobs Act. Additionally, we had a positive impact related to an adjustment of the transition tax liability.

Significant Events

2017 Restructuring – As part of the 2017 Restructuring, we recorded pre-tax charges of $29.5 million ($24.2 million post-tax) and $23.7 million ($20.6 million post-tax) during 2018 and 2017, respectively. These charges include goodwill and intangible asset impairment charges of $1.4 million and $2.2 million, respectively, in 2018 related to the exits of Denmark and

38

our cathodic protection activities in the Middle East, but exclude long-lived asset impairment charges of $86.4 million in 2017 for the Fyfe reporting unit noted below (see Notes 1 and 4 to the consolidated financial statements contained in this Report).
2016 Restructuring – As part of the 2016 Restructuring, we recorded pre-tax charges of $16.1 million ($10.3 million post-tax) during 2016 (see Note 4 to the consolidated financial statements contained in this Report).
Acquisition and Divestiture Expenses – We recorded pre-tax expenses of $7.0 million ($5.2 million post-tax), $3.1 million ($2.0 million post-tax) and $2.7 million ($1.9 million post-tax) during 2018, 2017 and 2016, respectively, related to the our acquisition and divestiture activity.
Divestiture – The sale of our pipe coating and insulation businesses in Louisiana resulted in a pre-tax loss of $7.0 million ($5.2 million post-tax) during 2018, which is included in “Other expense” in the Consolidated Statements of Operations (see Notes 1 and 6 to the consolidated financial statements contained in this Report).
Impairment of goodwill – We recorded pre-tax, non-cash goodwill impairment charges of $45.4 million ($42.2 million post-tax) during 2017. As part of the 2017 Restructuring, we exited all non-pipe related contract applications for the Tyfo® system in North America, permanently lowering the expected future cash flows of the reporting unit. As a result of this action, we evaluated the goodwill of our Fyfe reporting unit and determined that a triggering event occurred. The Fyfe reporting unit is included in the Infrastructure Solutions reportable segment (see Note 2 to the consolidated financial statements contained in this Report).
Impairment of long-lived assets – During 2017, we recorded pre-tax, non-cash long-lived asset impairment charges of $41.0 million ($36.4 million post-tax) related to the Fyfe reporting unit (see Note 2 to the consolidated financial statements contained in this Report). In the third quarter of 2017, as part of our 2017 Restructuring, we determined that the carrying value of the Fyfe North America asset group exceeded the fair value, which caused us to evaluate the long-lived assets of the asset group. Based on the results of the valuation, the carrying amount of certain long-lived assets at the Fyfe North America asset group, such as customer relationships, trademarks and patents, exceeded their fair value.
Legal settlement – In 2016, we settled two lawsuits related to the 2012 departure of several key leaders in sales and operations for the Tyfo® technology, which is part of the Infrastructure Solutions reportable segment. Under the settlement, we will receive $6.6 million, which was recorded as “Gain on litigation settlement” in the Consolidated Statement of Operations. The initial $3.6 million cash payment was received in December 2016 and the remainder is to be paid in $750,000 annual installments over a four-year period. Payments were received for 2017 and 2018.
Operating Results

(dollars in thousands)	Years Ended December 31,			2018 vs 2017 Increase (Decrease)		2017 vs 2016 Increase (Decrease)	
	2018	2017	2016	$	%	$	%
Revenues	$1,333,568	$1,359,019	$1,221,920	$(25,451)	(1.9)%	$137,099	11.2 %
Gross profit	266,926	284,812	253,927	(17,886)	(6.3)	30,885	12.2
Gross profit margin	20.0 %	21.0 %	20.8 %	N/A	(100)bp	N/A	20 bp
Operating expenses	219,823	226,173	197,897	(6,350)	(2.8)	28,276	14.3
Goodwill impairment	1,389	45,390	—	(44,001)	(96.9)	45,390	N/M
Definite-lived intangible asset impairment	2,169	41,032	—	(38,863)	(94.7)	41,032	N/M
Gain on litigation settlement	—	—	(6,625)	—	N/M	6,625	N/M
Acquisition and divestiture expenses	7,004	2,923	2,696	4,081	139.6	227	8.4
Restructuring and related charges [1]	6,894	12,814	9,168	(5,920)	(46.2)	3,646	39.8
Operating income (loss)	29,647	(43,520)	50,791	73,167	168.1	(94,311)	(185.7)
Operating margin	2.2 %	(3.2)%	4.2 %	N/A	540 bp	N/A	(740)bp
	2,928	(69,401)	29,453	72,329	104.2	(98,854)	(335.6)

Net income (loss) attributable
to Aegion Corporation

[1] See Note 4 to the consolidated financial statements contained in this Report for a complete accounting of all charges related to restructuring efforts.
"N/A" represents not applicable.

"N/M" represents not meaningful.

2018 Compared to 2017

Revenues

Revenues decreased $25.5 million, or 1.9%, to $1,333.6 million in 2018 compared to record revenues of $1,359.0 million in 2017. The decrease in revenues was due to a $62.4 million decrease in Corrosion Protection, driven by a $90.8 million decrease in revenues at our pipe coating and insulation operation, which completed a large deepwater project in 2017 and was sold during the third quarter of 2018. Also contributing to the decrease was an $8.0 million decrease in Infrastructure Solutions primarily as a result of lower CIPP contracting installation services activities in our North American and European operations. Partially offsetting these decreases was a $45.0 million increase in Energy Services mainly due to an increase in construction services activities and the successful completion of labor transitions at refineries to comply with labor laws in California.

Gross Profit and Gross Profit Margin

Gross profit decreased $17.9 million, or 6.3%, to $266.9 million in 2018 compared to $284.8 million in 2017. Included in gross profit are the following items: (i) restructuring charges of $1.9 million and $0.2 million in 2018 and 2017, respectively, related primarily to inventory write offs; and (ii) non-cash charges of $2.8 million in 2018 related to estimates for inventory obsolescence in our cathodic protection operations. Excluding these charges, gross profit decreased $13.4 million, or 4.7%, to $271.6 million in 2018 compared to $285.0 million in 2017. The decrease in gross profit was primarily due to: (i) a $15.3 million decrease in Corrosion Protection driven by a decrease in margins from our pipe coating and insulation operation, which completed a large offshore project in 2017 and was sold during the third quarter of 2018, partially offset by improved project performance in our U.S. cathodic protection operation and Middle East coating services operation; and (ii) a decrease of $8.4 million in Infrastructure Solutions primarily due to lower gross profit generated from CIPP contracting installation services activity in our North American operation and project performance issues in our European CIPP operations, most notably in Denmark and the Netherlands. Offsetting the decreases was a $5.8 million increase in Energy Services generated primarily from increased revenues and activity from maintenance and construction services.

Gross profit margin declined 100 basis points to 20.0% in 2018 compared to 21.0% in 2017. Excluding restructuring charges and the inventory obsolescence charge, gross profit margin decreased 60 basis points to 20.4% in 2018 compared to 21.0% in 2017. The decline was primarily due to a decrease in margins driven by our pipe coating and insulation operation in Corrosion Protection, and certain isolated project execution issues related to CIPP contracting installation services activity in our European and North American operations in Infrastructure Solutions. Offsetting the decreases was improved gross profit margin performance in Corrosion Protection, primarily related to improved project performance in our U.S. cathodic protection operation and high-margin project activities in our coating services operation, most notably in the Middle East.

Operating Expenses

Operating expenses decreased $6.4 million, or 2.8%, to $219.8 million in 2018 compared to $226.2 million in 2017. Included within operating expenses are restructuring charges totaling $13.2 million and $11.0 million in 2018 and 2017, respectively. Excluding these charges, operating expenses decreased $8.5 million, or 4.0%, to $206.6 million in 2018 compared to $215.2 million in 2017. The decrease in operating expenses was primarily due to: (i) a $5.7 million decrease in Infrastructure Solutions primarily from exiting contracting installation services for non-pressure pipe FRP applications in our North American operation and cost savings in connection with our 2017 Restructuring actions; (ii) a $6.6 million decrease in Corrosion Protection mainly due to cost savings achieved in connection with our 2017 Restructuring actions, the sale of Bayou in the third quarter of 2018, and lower incentive compensation expense. Partially offsetting the decrease in operating expenses was a $3.8 million increase in Energy Services primarily due to an increase in general and administrative expenses to support continued growth in the business and additional costs necessary to support the transition of our refinery personnel to the trade unions. Additionally, we recorded a reserve reversal for certain Brinderson pre-acquisition matters in 2017 that lessened the year-over-year decrease

Operating expenses as a percentage of revenues were 16.5% and 16.6% in 2018 and 2017, respectively. Excluding restructuring charges, operating expenses as a percentage of revenues were 15.5% and 15.8% in 2018 and 2017, respectively.

Consolidated Net Income (Loss)

Consolidated net income (loss) improved $72.3 million, or 104.2%, to consolidated net income of $2.9 million in 2018, from a consolidated net loss of $69.4 million in 2017. Included in consolidated net income (loss) were the following pre-tax items: (i) goodwill impairment charges of $1.4 million and $45.4 million in 2018 and 2017, respectively; (ii) definite-lived intangible asset impairment charges of $2.2 million and $41.0 million in 2018 and 2017, respectively; (iii) restructuring charges of $29.5 million and $24.0 million in 2018 and 2017, respectively; (iv) acquisition and divestiture expenses of $7.0 million and $3.1 million in 2018 and 2017, respectively; (v) a $2.8 million charge related to estimates for inventory obsolescence in our cathodic protection operations in 2018; (vi) credit facility amendment fees of $2.2 million in 2018; and (vii) a $7.0 million loss on the sale of Bayou in 2018.

Excluding the above items, consolidated net income increased $4.7 million, or 13.7%, to $39.2 million in 2018 from $34.4 million in 2017, primarily due to lower income taxes due to lower U.S. statutory rates, lower interest expense due to lower debt balances and reduced foreign currency transaction losses. Partially offsetting the increases in consolidated net income was lower operating income in 2018, primarily due to decreased revenues in Corrosion Protection's pipe coating and insulation operation driven by production in 2017 on a large deepwater project and subsequent divestiture in 2018.

2017 Compared to 2016

Revenues

Revenues increased $137.1 million, or 11.2%, to $1,359.0 million in 2017 compared to $1,221.9 million in 2016. The increase in revenues was due to a $54.7 million increase in Corrosion Protection, driven by a $53.5 million increase in revenues from the substantial completion of a large deepwater project in our pipe coating and insulation operation as well as increased international project activities in our coating services and industrial linings operations, a $41.8 million increase in Energy Services mainly due to increased turnaround services activities and, to a lesser extent, construction and maintenance services activities, and a $40.6 million increase in Infrastructure Solutions primarily as a result of increased CIPP contracting installation services activities in our North American and European operations.

Gross Profit and Gross Profit Margin

Gross profit increased $30.9 million, or 12.2%, to $284.8 million in 2017 compared to $253.9 million in 2016. The increase in gross profit was primarily due to a $25.0 million increase in Corrosion Protection largely driven by higher revenues, as discussed above, and a $7.5 million increase in Energy Services generated mainly from increased revenues, improved project performance and project mix. Partially offsetting the increases in gross profit was a decrease of $1.6 million in Infrastructure Solutions primarily due to operations included in our 2017 Restructuring which experienced a decline in high-margin revenues and lower project performance associated with FRP project activity in our North American operation and lower project performances in CIPP contracting installation services activity in Australia and Denmark within our Asia-Pacific and European operations, respectively. Substantially offsetting the decrease in gross profit in Infrastructure Solutions was an increase in our North American operation primarily driven by higher CIPP revenues and an expense of $3.6 million in 2016 related to the recognition of inventory step up expense associated with the acquisition of Underground Solutions.

Gross profit margin improved 20 basis points to 21.0% in 2017 compared to 20.8% in 2016. The improvement was primarily due to higher gross profit margin performance in Corrosion Protection driven by higher margin projects and improved project performance, specifically related to the large deepwater project and international project activities noted above, and higher gross profit margin in Energy Services resulting from improved project performance, project mix and the elimination of cost overruns on certain isolated lump sum construction projects associated with the downsizing of our upstream operation in 2016. Partially offsetting the increases in gross profit margin was a decrease in Infrastructure Solutions primarily due to lower project performances in CIPP contracting installation services activity in Australia and Denmark within our Asia-Pacific and European operations, respectively, and in FRP project activity in our North American operation.

Operating Expenses

Operating expenses increased $28.3 million, or 14.3%, to $226.2 million in 2017 compared to $197.9 million in 2016. Included within operating expenses are restructuring charges totaling $11.0 million and $6.2 million in 2017 and 2016, respectively. Excluding these charges, operating expenses increased $23.4 million, or 12.2%, to $215.2 million in 2017 compared to $191.7 million in 2016. The increase in operating expenses was primarily due to: (i) an $8.5 million increase in Infrastructure Solutions, mostly driven by incremental operating expense contributions from acquisitions made in 2017 and 2016 and investments made to hire professional sales and administrative staff to facilitate continued growth in our North American operation; (ii) a $10.1 million increase in Corrosion Protection mainly due to increased incentive compensation expense, higher bad debt reserves, gains from sales of fixed assets in 2016 and added sales and administrative support costs; and (iii) a $4.9 million increase in Energy Services resulting from a $4.1 million decrease in reserves for certain Brinderson pre-acquisition matters in 2016, increased incentive

compensation expense and an increase in general and administrative costs to support continued growth.
Operating expenses as a percentage of revenues were 16.6% and 16.2% in 2017 and 2016, respectively. Excluding restructuring charges, operating expenses as a percentage of revenues were 15.8% and 15.7% in 2017 and 2016, respectively.

Consolidated Net Income (Loss)

Consolidated net income (loss) decreased $98.9 million to a consolidated net loss of $69.4 million in 2017, from consolidated net income of $29.5 million in 2016. Included in consolidated net income (loss) were the following items: (i)

goodwill impairment charges of $45.4 million ($42.2 million post-tax) in 2017; (ii) definite-lived intangible asset impairment charges of $41.0 million ($36.4 million post-tax) in 2017; (iii) restructuring charges of $24.0 million ($20.8 million post-tax) and $15.9 million ($10.2 million post-tax) in 2017 and 2016, respectively; (iv) gain on a litigation settlement of $6.6 million ($4.0 million post-tax) in 2016; and (v) acquisition and divestiture expenses of $3.1 million ($2.0 million post-tax) and $2.7 million ($2.2 million post-tax) in 2017 and 2016, respectively.
Excluding the above items, consolidated net income decreased $5.8 million, or 15.3%, to $32.0 million in 2017 from $37.8 million in 2016. The decrease was due to: (i) lower gross profit primarily from performances in operations that are included in our 2017 Restructuring within Infrastructure Solutions; (ii) an increase in consolidated operating expenses; (iii) negative impacts from foreign currency losses; and (iv) higher tax expense primarily due to negative impacts associated with changes in tax valuation allowances and a $2.4 million charge related to TCJA. Partially offsetting the decreases in consolidated net income noted above were higher revenues and related gross profit in Corrosion Protection and Energy Services.

Contract Backlog

Contract backlog is our expectation of revenues to be generated from received, signed and uncompleted contracts, the cancellation of which is not anticipated at the time of reporting. We assume these signed contracts are funded. For government or municipal contracts, our customers generally obtain funding through local budgets or pre-approved bond financing. We have not undertaken a process to verify funding status of these contracts and, therefore, cannot reasonably estimate what portion, if any, of contracts in backlog have not been funded. However, we have little history of signed contracts being canceled due to the lack of funding. Contract backlog excludes any term contract amounts for which there are not specific and determinable work releases and projects where we have been advised that we are the low bidder, but have not formally been awarded the contract.
The following table summarizes our consolidated backlog by segment (in millions):

	December 31,		
	2018	2017	2016
Infrastructure Solutions [(1)]	$323.3	$328.9	$283.4
Corrosion Protection [(2)]	127.9	155.7	213.4
Energy Services	218.2	207.8	192.8
Total backlog [(3)]	$669.4	$692.4	$689.6

(1) December 31, 2018, 2017 and 2016 included backlog from exited or to-be exited operations of $10.0 million, $29.6 million and $21.8 million, respectively.

(2) December 31, 2018, 2017 and 2016 included backlog from exited or to-be exited operations of $11.6 million, $45.7 million and $117.1 million, respectively.

(3) Total backlog for December 31, 2018, 2017 and 2016 included backlog from exited or to-be exited operations of $21.6 million, $75.3 million and $138.9 million, respectively.

Included within backlog for Energy Services are amounts that represent expected revenues to be realized under long-term MSAs and other signed contracts. If the remaining term of these arrangements exceeds 12 months, the unrecognized revenues attributable to such arrangements included in backlog are limited to only the next 12 months of expected revenues. Although backlog represents only those contracts and MSAs that are considered to be firm, there can be no assurance that cancellation or scope adjustments will not occur with respect to such contracts.
Within our Infrastructure Solutions and Corrosion Protection segments, certain contracts are performed through our variable interest entities, in which we own a controlling portion of the entity. As of December 31, 2018, 0.6% and 17.7% of our Infrastructure Solutions backlog and Corrosion Protection backlog, respectively, related to these variable interest entities. A substantial majority of our contracts in these two segments are fixed price contracts with individual private businesses and municipal and federal government entities across the world. Energy Services, however, generally enters into cost reimbursable contracts that are based on costs incurred at agreed upon contractual rates.
In accordance with industry practice, substantially all of our contracts are subject to cancellation or termination at the discretion of the customer. In a situation where a customer terminates a contract, we would ordinarily be entitled to receive payment for work performed up to the date of termination and, in certain circumstances, we may be entitled to

allowable termination and cancellation costs. There were no significant cancellations in 2018.

While management uses all information available to it to determine backlog, our backlog at any given time is subject to changes in the scope of services to be provided as well as increases or decreases in costs relating to the contracts included therein. Accordingly, backlog is not necessarily a reliable indicator of future revenues.

Total contract backlog decreased $23.0 million, or 3.3%, to $669.4 million at December 31, 2018 from $692.4 million at December 31, 2017. The decrease in backlog was due primarily to the sale of Bayou and exiting certain international businesses during 2018 as a result of the 2017 Restructuring. Excluding exited and to-be exited operations, backlog at December 31, 2018 increased $30.7 million, or 5.0%, from December 31, 2017. The increase was to due to: (i) increased activity in the North American Corrosion Protection market; and (ii) increased market share on the West Coast of the United States, primarily California, for our maintenance services activities in Energy Services; partially offset by work performed on onshore and offshore gas field development contracts in the Middle East that were included in backlog at December 31, 2017.

Consolidated customer orders, net of cancellations (“New Orders”), decreased $28.5 million, or 2.1%, to $1,333.8 million in 2018 compared to $1,362.3 million in 2017. New Orders in 2016 were $1,134.9 million.

Subject to factors discussed in Item 1A – “Risk Factors”, we estimate that approximately $613.9 million, or 91.7%, of total backlog at December 31, 2018 will be realized as revenues in 2019.

Segment Results

Infrastructure Solutions Segment

Key financial data for Infrastructure Solutions was as follows:

(dollars in thousands)	Years Ended December 31,			2018 vs 2017 Increase (Decrease)		2017 vs 2016 Increase (Decrease)	
	2018	2017	2016	$	%	$	%
Revenues	$604,121	$612,154	$571,551	$(8,033)	(1.3)%	$40,603	7.1%
Gross profit	132,411	140,823	142,444	(8,412)	(6.0)	(1,621)	(1.1)
Gross profit margin	21.9%	23.0%	24.9%	N/A	(110)bp	N/A	(190)bp
Operating expenses	100,349	106,834	89,844	(6,485)	(6.1)	16,990	18.9
Goodwill impairment	1,389	45,390	—	(44,001)	N/M	45,390	N/M
Definite-lived intangible asset impairment	870	41,032	—	(40,162)	N/M	41,032	N/M
Gain on litigation settlement	—	—	(6,625)	—	N/M	6,625	N/M
Acquisition and divestiture expenses	814	651	2,696	163	25.0	(2,045)	(75.9)
Restructuring and related charges [1]	5,306	9,160	2,630	(3,854)	(42.1)	6,530	248.3
Operating income (loss)	23,683	(62,244)	53,899	85,927	138.0	(116,143)	(215.5)
Operating margin	3.9%	(10.2)%	9.4%	N/A	1,410bp	N/A	(1,960)bp

[1] See Note 4 to the consolidated financial statements contained in this Report for a complete accounting of all charges related to restructuring efforts.

“N/A” represents not applicable.

“N/M” represents not meaningful.

2018 Compared to 2017

Revenues

Revenues in Infrastructure Solutions decreased $8.0 million, or 1.3%, to $604.1 million in 2018 compared to $612.2 million in 2017. The decrease in revenues was primarily driven by: (i) a decrease in CIPP contracting installation services activity in North America as a result of an unfavorable mix of work performed (despite a 5% increase in installed CIPP liner footage, average revenue per foot declined nearly 8% due to a higher mix of lower-value, small-diameter projects, which negatively impacted revenues by nearly $35 million); (ii) a decrease in FRP project activity in our North American operation, specifically associated with our exit of non-pressure pipe FRP contracting installation services activity in North America as part of our 2017 Restructuring; and (iii) a decrease in license royalty income from a $3.9 million license settlement in 2017 in our North American CIPP operation. Partially offsetting the decreases in revenues was an increase in Fusible PVC® project activity and royalty income in our North American operation.

Gross Profit and Gross Profit Margin

Gross profit in Infrastructure Solutions decreased $8.4 million, or 6.0%, to $132.4 million in 2018 compared to $140.8 million in 2017. Included in gross profit are restructuring charges of $1.3 million and $0.1 million in 2018 and 2017, respectively. Excluding restructuring charges, gross profit decreased $7.3 million, or 5.2%, to $133.7 million in 2018 compared to $141.0 million in 2017. Gross profit decreased primarily due to lower revenues, execution issues and project write-downs related to CIPP contracting installation services activity in our North American and European operations. Additionally, severe weather negatively impacted North American CIPP productivity during the first four months of 2018 and an unfavorable project mix negatively impacted gross profit during the second half of 2018. Partially offsetting the decreases in gross profit and gross profit margin was improved execution of FRP project activity in our North American operation and CIPP project activity in our Australian operation. Additionally, gross profit and gross profit margin improvements were noted as Fusible PVC® project activity increased in our North American operation.

Gross profit margin declined 110 basis points to 21.9% in 2018 from 23.0% in 2017. Excluding restructuring charges, gross profit margin declined 90 basis points to 22.1% in 2018 from 23.0% in 2017. Gross profit margin declined primarily due to the same factors impacting the changes in gross profit, as noted above.

Operating Expenses

Operating expenses in Infrastructure Solutions decreased $6.5 million, or 6.1%, to $100.3 million in 2018 compared to $106.8 million in 2017. As part of our restructuring efforts, we recognized charges totaling $8.0 million and $8.8 million in 2018 and 2017, respectively, related to cost reduction efforts. Excluding restructuring charges, operating expenses decreased $5.7 million, or 5.8%, to $92.3 million in 2018 compared to $98.1 million in 2017. The decrease in operating expenses was primarily due to exiting contracting installation services for non-pressure pipe FRP applications in our North American operation, cost savings in connection with our 2017 Restructuring actions, lower incentive compensation in our North American operation and lower costs allocated from our corporate administrative function.

Operating expenses as a percentage of revenues were 16.6% and 17.5% in 2018 and 2017, respectively. Excluding restructuring charges, operating expenses as a percentage of revenues were 15.3% and 16.0% in 2018 and 2017, respectively.

Operating Income (Loss) and Operating Margin

Operating income (loss) in Infrastructure Solutions increased $85.9 million, or 138.0%, to $23.7 million in 2018 compared to a loss of $62.2 million in 2017. Operating margin improved to 3.9% in 2018 compared to (10.2)% in 2017. Included in operating income (loss) were the following items: (i) goodwill impairment charges of $1.4 million and $45.4 million in 2018 and 2017, respectively; (ii) definite-lived intangible asset impairment charges of $0.9 million and $41.0 million in 2018 and 2017, respectively; (iii) restructuring charges of $14.6 million and $18.1 million in 2018 and 2017, respectively, primarily related to severance, extension of benefits, employee assistance programs, wind-down and other restructuring costs; and (iv) acquisition and divestiture related expenses of $0.8 million and $0.7 million in 2018 and 2017.

Excluding the above items, operating income decreased $1.5 million, or 3.6%, to $41.4 million in 2018 compared to $42.9 million in 2017 and operating margin declined 20 basis points to 6.8% in 2018 from 7.0% in 2017. Operating income and operating margin deceased primarily due to: (i) severe weather that negatively impacted productivity in our North American CIPP contracting operation during the first four months of 2018; (ii) a $3.9 million favorable license royalty settlement in 2017; (iii) certain isolated project execution issues related to CIPP contracting installation services activity in our European and North American operations; and (iv) increasing labor, fuel and chemical costs in our North America operation. Offsetting these decreases were increases in operating income primarily due to higher revenues and profitability from Fusible PVC® project activity in our North American operation and cost savings in our North American FRP operation in connection with our 2017 Restructuring actions.

2017 Compared to 2016

Revenues

Revenues in Infrastructure Solutions increased $40.6 million, or 7.1%, to $612.2 million in 2017 compared to $571.6 million in 2016. The increase in revenues was primarily driven by record CIPP revenues in our North American operation. Revenues also improved as a result of an increase in CIPP contracting installation services activity in our European operation and FRP project activity in our Asia-Pacific operation, both of which benefited from business acquisitions in the second and third quarters of 2016, respectively. Partially offsetting the increases in revenues was a decrease in FRP project activity in our North American operation, specifically associated with non-pressure pipe FRP contracting installation services activity. As part of our 2017 Restructuring, we are exiting contracting installation services for non-pressure pipe FRP applications within the North American market.

Gross Profit and Gross Profit Margin

Gross profit in Infrastructure Solutions decreased $1.6 million, or 1.1%, to $140.8 million in 2017 compared to $142.4 million in 2016. Gross profit decreased primarily due to operations included in our 2017 Restructuring, which experienced a decline in high-margin revenues and lower project performance associated with FRP project activity in our North American operation and lower project performance in CIPP contracting installation services activity in Australia and Denmark within our Asia-Pacific and European operations, respectively. Substantially offsetting the decreases in gross profit were increases primarily driven by higher revenues within our North American operation associated with CIPP contracting installation services activity, royalty income from a $3.9 million license settlement and an expense of $3.6 million in 2016 related to the recognition of inventory step-up required in the accounting for business combinations related to the Underground Solutions acquisition in February 2016.

Gross profit margin declined 190 basis points to 23.0% in 2017 from 24.9% in 2016. Gross profit margin declined primarily due to the same factors impacting the changes in gross profit, as noted above.

Operating Expenses

Operating expenses in Infrastructure Solutions increased $17.0 million, or 18.9%, to $106.8 million in 2017 compared to $89.8 million in 2016. As part of our restructuring efforts, we recognized charges totaling $8.8 million and $0.3 million in 2017 and 2016, respectively, related to cost reduction efforts. Excluding restructuring charges, operating expenses increased $8.5 million, or 9.5%, to $98.1 million in 2017 compared to $89.6 million in 2016. The increase in operating expenses was primarily due to incremental operating expense contributions from acquisitions in the European CIPP market and the Asia-Pacific FRP market during 2017 and 2016, as well as the operating expense contribution from the acquisition of Underground Solutions in the first quarter of 2016. Operating expenses also increased as a result of investments in the hiring of experienced sales and business development professionals and administrative support costs to facilitate continued growth in our North American operation.

Operating expenses as a percentage of revenues were 17.5% and 15.7% in 2017 and 2016, respectively. Excluding restructuring charges, operating expenses as a percentage of revenues were 16.0% and 15.7% in 2017 and 2016, respectively.

Operating Income (Loss) and Operating Margin

Operating income (loss) in Infrastructure Solutions decreased $116.1 million to a loss of $62.2 million in 2017 compared to income of $53.9 million in 2016. Operating margin declined to (10.2)% in 2017 compared to 9.4% in 2016. Included in operating income (loss) were the following items: (i) goodwill impairment charges of $45.4 million in 2017; (ii) definite-lived intangible asset impairment charges of $41.0 million in 2017; (iii) restructuring charges of $18.1 million and $2.9 million in 2017 and 2016, respectively, primarily related to severance, extension of benefits, employee assistance programs, wind-down and other restructuring costs; (iv) acquisition and divestiture related expenses of $0.7 million and $2.7 million in 2017 and 2016, respectively; (v) inventory step-up expense of $3.6 million associated with the acquisition of Underground Solutions in 2016; and (vi) gain on litigation settlement of $6.6 million related to our FRP business in North America in 2016.

Excluding the above items, operating income decreased $13.6 million, or 24.1%, to $42.9 million in 2017 compared to $56.5 million in 2016 and operating margin declined 290 basis points to 7.0% in 2017 from 9.9% in 2016. Operating income and operating margin deceased primarily due to poor international CIPP project performances specifically in Australia and Denmark, declining revenues and lower project performance related to FRP project activity in our North American operation and higher operating expenses resulting from acquisitions and growth initiatives. Partially offsetting the decreases in operating income and operating margin were increases mainly driven by higher revenues and related gross profit from our North American CIPP operation, as discussed above.

Corrosion Protection Segment

Key financial data for Corrosion Protection was as follows:

(dollars in thousands)	Years Ended December 31,			2018 vs 2017 Increase (Decrease)		2017 vs 2016 Increase (Decrease)	
	2018	2017	2016	$	%	$	%
Revenues	$393,740	$456,139	$401,469	$(62,399)	(13.7)%	$54,670	13.6 %
Gross profit	92,968	108,240	83,269	(15,272)	(14.1)	24,971	30.0
Gross profit margin	23.6 %	23.7 %	20.7 %	N/A	(10)bp	N/A	300 bp
Operating expenses	86,017	89,868	78,008	(3,851)	(4.3)	11,860	15.2
Acquisition and divestiture expenses	6,165	2,272	—	3,893	171.3	2,272	N/M
Restructuring and related charges [1]	1,354	3,654	3,803	(2,300)	(62.9)	(149)	(3.9)
Operating income (loss)	(1,867)	12,446	1,458	(14,313)	(115.0)	10,988	753.6
Operating margin	(0.5)%	2.7 %	0.4 %	N/A	(320)bp	N/A	230 bp

[1] See Note 4 to the consolidated financial statements contained in this Report for a complete accounting of all charges related to restructuring efforts.

"N/A" represents not applicable.

"N/M" represents not meaningful.

2018 Compared to 2017

Revenues

Revenues in Corrosion Protection decreased $62.4 million, or 13.7%, to $393.7 million in 2018 compared to $456.1 million in 2017. The decrease was primarily due to a $90.8 million decrease in revenues in our pipe coating and insulation operation driven by production on a large deepwater project in 2017 and its subsequent divestiture in the third quarter of 2018. Also contributing to the decrease in revenues was a decrease in project activities in our cathodic protection operation in North America and our industrial linings operation in South America. Partially offsetting the decreases in revenues was an increase in revenues in our coating services operation, which benefited from increased project activity in the Middle East and its field services operation in North America.

Gross Profit and Gross Profit Margin

Gross profit in Corrosion Protection decreased $15.3 million, or 14.1%, to $93.0 million in 2018 compared to $108.2 million in 2017. Included in gross profit are the following items: (i) restructuring charges of $0.6 million in 2018 related to write offs of other assets; and (ii) non-cash charges of $2.8 million in 2018 related to estimates for inventory obsolescence in our cathodic protection operations. Excluding these charges, gross profit decreased $11.9 million, or 11.0%, to $96.4 million in 2018 compared to 2017. The decrease in gross profit was substantially due to our pipe coating and insulation operation related to the reduced revenues as described above, partially offset by project activities in our Middle East coating services operation.

Gross profit margin declined 10 basis points to 23.6% in 2018 from 23.7% in 2017. Excluding restructuring charges and the inventory obsolescence charge, gross profit margin improved 80 basis points to 24.5% in 2018 compared to 2017. The gross profit margin improvement was driven by high-margin project activities in our coating services operation, most notably in the Middle East, and improved project performance in our U.S. cathodic protection operation.

Operating Expenses

Operating expenses in Corrosion Protection decreased $3.9 million, or 4.3%, to $86.0 million in 2018 compared to $89.9 million in 2017. As a part of our restructuring efforts, we recognized charges of $5.0 million and $2.2 million in 2018 and 2017, respectively. Excluding these restructuring charges, operating expenses decreased $6.6 million, or 7.6%, to $81.0 million in 2018 compared to $87.6 million in 2017. Operating expenses decreased primarily due to cost savings achieved in connection with our 2017 Restructuring actions, as well as lower incentive compensation expense and lower costs allocated from our corporate administrative function.

Operating expenses as a percentage of revenues were 21.8% and 19.7% in 2018 and 2017, respectively. Excluding restructuring charges, as noted above, operating expenses as a percentage of revenues were 20.6% and 19.2% in 2018 and 2017, respectively.

Operating Income (Loss) and Operating Margin

Operating income (loss) in Corrosion Protection decreased $14.3 million, or 115.0%, to an operating loss of $1.9 million in 2018 compared to operating income of $12.4 million in 2017. Operating margin declined 320 basis points to (0.5)% in 2018 compared to 2.7% in 2017. Included in operating income (loss) were the following items: (i) restructuring charges of $8.3 million and $5.9 million in 2018 and 2017, respectively, related to employee severance, retention, extension of benefits, employee assistance programs, early lease termination, wind-down and other restructuring costs; (ii) a $2.8 million non-cash charge related to estimates for inventory obsolescence in 2018; and (iii) acquisition and divestiture related expenses of $6.2 million and $2.3 million in 2018 and 2017, respectively, primarily related to the sale of our pipe coating and insulation operation.

Excluding the above items, operating income decreased $5.3 million, or 25.6%, to $15.4 million in 2018 compared to $20.6 million in 2017 and operating margin declined 60 basis points to 3.9% in 2018 from 4.5% in 2017. The decreases in operating income and operating margin were primarily the result of lower revenues and related gross profit in our pipe coating and insulation operation driven by production on a large deepwater project in 2017 and its subsequent divestiture in 2018. Partially offsetting the decreases in operating income and operating margin were increases generated from our coating service operation in the Middle East and our U.S. cathodic protection operation, as well as reduced operating expenses as described above.

2017 Compared to 2016

Revenues

Revenues in Corrosion Protection increased $54.7 million, or 13.6%, to $456.1 million in 2017 compared to $401.5 million in 2016. The increase was primarily due to a $46.2 million increase in revenues in our pipe coating and insulation operation, which included revenues from the substantial completion of a large deepwater project totaling $93.6 million and $40.1 million in 2017 and 2016, respectively. Also contributing to the increase in revenues was an increase in international project activities, primarily in the Middle East and North America, in our coating services and industrial linings operations. Partially offsetting the increases in revenues was a decline in revenues in our cathodic protection operation, primarily in North America and Europe, as well as a decline in domestic revenues in our industrial linings operation.

Gross Profit and Gross Profit Margin

Gross profit in Corrosion Protection increased $25.0 million, or 30.0%, to $108.2 million in 2017 compared to $83.3 million in 2016. The increase in gross profit was substantially due to production on a large deepwater project in our pipe coating and insulation operation and, to a lesser extent, increased gross profit in our coating services operation driven primarily from project activities in the Middle East and in our industrial linings operation generated primarily from project activities in several international countries. Partially offsetting the increases in gross profit was a decrease in our cathodic protection operation resulting from project mix and isolated project performance issues in the United States and weaker oil and gas market conditions in Canada.

Gross profit margin improved 300 basis points to 23.7% in 2017 from 20.7% in 2016 primarily due to higher margins generated from a large deepwater project in our pipe coating and insulation operation and higher margin projects performed in the Middle East in our coating services, industrial linings and cathodic protection operations. Partially offsetting the increases in gross profit margin was a decline resulting from project mix and isolated project performance issues in the United States in our cathodic protection operation.

Operating Expenses

Operating expenses in Corrosion Protection increased $11.9 million, or 15.2%, to $89.9 million in 2017 compared to $78.0 million in 2016. As a part of our restructuring efforts, we recognized charges of $2.2 million and $0.5 million in 2017 and 2016, respectively, related to the downsizing of certain midstream and upstream operations. Excluding these restructuring charges, operating expenses increased $10.1 million, or 13.0%, to $87.6 million in 2017 compared to $77.5 million in 2016. The increase in operating expenses was primarily due to increased incentive compensation expense, higher bad debt reserves, gains from sales of fixed assets in 2016 and added sales and administrative support costs.

Operating expenses as a percentage of revenues were 19.7% and 19.4% in 2017 and 2016, respectively. Excluding restructuring charges, as noted above, operating expenses as a percentage of revenues were 19.2% and 19.3% in 2017 and 2016, respectively.

Operating Income and Operating Margin

Operating income in Corrosion Protection increased $11.0 million, or 753.6%, to $12.4 million in 2017 compared to $1.5 million in 2016. Operating margin improved 230 basis points to 2.7% in 2017 compared to 0.4% in 2016. Included in operating income were the following items: (i) restructuring charges of $5.9 million and $4.6 million in 2017 and 2016,

respectively, related to employee severance, retention, extension of benefits, employee assistance programs, early lease termination, wind-down and other restructuring costs; and (ii) acquisition and divestiture related expenses of $2.3 million in 2017 primarily related to the planned sale of our pipe coating and insulation operation.
Excluding restructuring charges and acquisition and divestiture expenses, operating income increased $14.6 million, or 242.7%, to $20.6 million in 2017 compared to $6.0 million in 2016 and operating margin improved 300 basis points to 4.5% in 2017 from 1.5% in 2016. The increases in operating income and operating margin were substantially due to increased gross profit and related gross profit margin contribution from a large deepwater project in our pipe coating and insulation operation and, to a lesser extent, increased contribution from international project activities primarily in the Middle East in our coating services operation, partially offset by a lower contribution from our cathodic protection operation and increased operating expenses, as noted above.

Energy Services Segment
Key financial data for Energy Services was as follows:

(dollars in thousands)	Years Ended December 31,			2018 vs 2017 Increase (Decrease)		2017 vs 2016 Increase (Decrease)	
	2018	2017	2016	$	%	$	%
Revenues	$335,707	$290,726	$248,900	$44,981	15.5 %	$41,826	16.8 %
Gross profit	41,547	35,749	28,214	5,798	16.2	7,535	26.7
Gross profit margin	12.4 %	12.3 %	11.3 %	N/A	10 bp	N/A	100 bp
Operating expenses	33,457	29,471	30,045	3,986	13.5	(574)	(1.9)
Acquisition and divestiture expenses	25	—	—	25	N/M	—	N/M
Restructuring and related charges [1]	234	—	2,735	234	N/M	(2,735)	N/M
Operating income (loss)	7,831	6,278	(4,566)	1,553	24.7	10,844	(237.5)
Operating margin	2.3 %	2.2 %	(1.8)%	N/A	10 bp	N/A	400 bp

[1] See Note 4 to the consolidated financial statements contained in this Report for a complete accounting of all charges related to restructuring efforts.
"N/A" represents not applicable.
"N/M" represents not meaningful.

2018 Compared to 2017

Revenues

Revenues in Energy Services increased $45.0 million, or 15.5%, to $335.7 million in 2018 compared to $290.7 million in 2017. The increase was primarily due to higher volume associated with construction services activity and increased maintenance services activities. These increases were the result of increased demand from existing customers and successful completion of several labor transitions at refineries to comply with labor laws in California.

Gross Profit and Gross Profit Margin

Gross profit in Energy Services increased $5.8 million, or 16.2%, to $41.5 million in 2018 compared to $35.7 million in 2017. The increase in gross profit was primarily due to an increase in revenues, mostly driven by maintenance and construction services activity, and completion of labor transitions at refineries, as noted above. Gross profit margin improved 10 basis points to 12.4% in 2018 compared to 12.3% in 2017.

Operating Expenses

Operating expenses in Energy Services increased $4.0 million, or 13.5%, to $33.5 million in 2018 compared to $29.5 million in 2017 primarily due to an increase in general and administrative expenses to support continued growth in the business and additional costs necessary to support the transition of our refinery personnel to the trade unions, partially offset by lower costs allocated from our corporate administrative function. Additionally, 2017 included a $1.5 million reserve reversal for certain Brinderson pre-acquisition matters.
Operating expenses as a percentage of revenues were 10.0% and 10.1% in 2018 and 2017, respectively. Excluding restructuring charges noted above, operating expenses as a percentage of revenues were 9.9% and 10.1% in 2018 and

2017, respectively.

Operating Income and Operating Margin

Operating income in Energy Services increased $1.6 million, or 24.7%, to income of $7.8 million in 2018 compared to $6.3 million in 2017. Operating margin improved 10 basis points to 2.3% in 2018 from 2.2% in 2017. Included in operating income were restructuring charges of $0.4 million in 2018 primarily related to severance, extension of benefits, employee assistance programs and other restructuring costs.

Excluding restructuring charges, operating income increased $2.0 million, or 31.3%, to $8.2 million in 2018 compared to $6.3 million in 2017 and operating margin declined 20 basis points to 2.4% in 2018 compared to 2.2% in 2017. These increases were primarily due to increased revenues and gross profit contributions from maintenance services activities as a result of increased demand from existing customers, partially offset by decreased gross profit contributions associated with higher-margin turnaround services activities; (ii) project performance execution issues on a large lump-sum construction services project; and (iii) increased operating expenses from investments to support the business and a reserve reversal for certain Brinderson pre-acquisition matters in 2017.

2017 Compared to 2016

Revenues

Revenues in Energy Services increased $41.8 million, or 16.8%, to $290.7 million in 2017 compared to $248.9 million in 2016. The increase was primarily due to turnaround services activity generated from an increase in the number of turnaround plans performed in 2017 and the related turnaround labor volume, which more than doubled in 2017 compared to 2016. An increase in construction and maintenance services activities also contributed to the increase in revenues. These increases in revenues were the result of increased demand from existing customers, coupled with expanded market share from various customers primarily on the West Coast of the United States.

Gross Profit and Gross Profit Margin

Gross profit in Energy Services increased $7.5 million, or 26.7%, to $35.7 million in 2017 compared to $28.2 million in 2016. The increase in gross profit was primarily due to improved revenues, as noted above, and improved project performance and project mix in turnaround, construction and maintenance services activities. Also contributing to the increase in gross profit was the elimination of cost overruns mainly from certain isolated lump sum construction projects in the first half of 2016 associated with the downsizing of our upstream operation in 2016.

Gross profit margin improved 100 basis points to 12.3% in 2017 compared to 11.3% in 2016 primarily due to improved project performance, project mix and the elimination of cost overruns on certain isolated lump sum construction projects, as discussed above.

Operating Expenses

Operating expenses in Energy Services decreased $0.6 million, or 1.9%, to $29.5 million in 2017 compared to $30.0 million in 2016. As part of our restructuring efforts, we recognized charges of $5.4 million in 2016 primarily related to downsizing our upstream operation. Excluding restructuring charges, operating expenses increased $4.9 million, or 19.8%, primarily due to a $4.1 million decrease in reserves for certain Brinderson pre-acquisition matters in 2016, increased incentive compensation expense and an increase in general and administrative expenses to support continued growth of the business.

Operating expenses as a percentage of revenues were 10.1% and 12.1% in 2017 and 2016, respectively. Excluding restructuring charges noted above, operating expenses as a percentage of revenues were 10.1% and 9.9% in 2017 and 2016, respectively.

Operating Income (Loss) and Operating Margin

Operating income (loss) in Energy Services increased $10.8 million to income of $6.3 million in 2017 compared to a loss of $4.6 million in 2016. Operating margin improved 400 basis points to 2.2% in 2017 from (1.8)% in 2016. Included in operating income (loss) were restructuring charges of $8.2 million in 2016 primarily related to severance, retention, extension of benefits, employee assistance programs, wind-down, early lease termination and other restructuring costs related to the downsizing of our upstream operation.

Excluding restructuring charges, operating income increased $2.7 million, or 74.1%, to $6.3 million in 2017 compared to $3.6 million in 2016 and operating margin improved 80 basis points to 2.2% in 2017 compared to 1.4% in 2016. These increases were primarily due to higher revenues and related gross profit generated from increased turnaround, construction and maintenance services activities, partially offset by an increase in operating expenses, as discussed above.

Other Income (Expense)

Interest Income and Expense

Interest income increased $0.4 million in 2018 compared to 2017 primarily due to interest received on the $8.0 million note receivable acquired in the Bayou sale. Interest expense increased by $1.3 million to $17.3 million in 2018 compared to $16.0 million in 2017. During 2018, we recognized expenses of $2.2 million related to certain arrangement and other fees associated with amending our credit facility as well as the write-off of previously unamortized deferred financing costs. Both charges were recorded to “Interest expense” in the Consolidated Statement of Operations. Excluding these charges, interest expense decreased by $0.9 million as compared to 2017 due to reduced loan principal balances, partially offset by higher LIBOR-based borrowing costs under our amended Credit Facility.

Interest income decreased less than $0.1 million in 2017 compared to 2016. Interest expense increased by $1.0 million to $16.0 million in 2017 compared to $15.0 million in 2016. Interest expense increased primarily due to rising LIBOR-based borrowing costs under our Credit Facility, partially offset by reduced outstanding loan principal balances during 2017 compared to 2016.

Other Income (Expense)

Other expense was $9.9 million in 2018, which included: (i) charges of $7.0 million related to the loss on sale of our pipe coating and insulation businesses in Louisiana; (ii) charges of $4.0 million related to the dissolution of certain restructured entities including the release of cumulative currency translation adjustments resulting from those disposals; and (iii) foreign currency transaction losses. Partially offsetting the charges was income of $1.3 million related to the release of a long-term retirement obligation.

Other expense was $2.2 million in 2017 and primarily consisted of foreign currency transaction losses. Other expense was $0.7 million in 2016 and primarily consisted of foreign currency transaction losses, partially offset by the release of cumulative currency translation gains related to disposed entities.

Taxes on Income (Loss)

On December 22, 2017, the U.S. government enacted the TCJA. The TCJA includes significant changes to the U.S. corporate income tax system including: (i) a federal corporate rate reduction from 35% to 21%; (ii) limitations on the deductibility of interest expense and executive compensation; (iii) creation of new minimum taxes such as the Global Intangible Low Taxed Income (“GILTI”) tax and the base erosion anti-abuse tax (“BEAT”); and (iv) the transition of U.S. international taxation from a worldwide tax system to a modified territorial tax system, which resulted in a one time U.S. tax liability on those earnings that had not previously been repatriated to the U.S. Beginning in 2018, we no longer record U.S. federal income tax on our share of income from foreign subsidiaries and no longer record a benefit for foreign tax credits related to that income.

Taxes on income (loss) decreased $5.1 million to a benefit of $0.1 million in 2018 compared to $5.0 million in 2017. Our effective tax rate was negative 4.5% and negative 8.1% in 2018 and 2017, respectively. The effective tax rate in 2018 was positively impacted by: (i) a $1.9 million adjustment to the mandatory deemed repatriation tax on foreign earnings; and (ii) a $1.5 million discrete item related to employee share-based awards that vested during 2018. Together, the adjustment to the repatriation tax and the discrete item had a 114.6% benefit to the effective tax rate during 2018. Partially offsetting the benefits were valuation allowances recorded on certain net operating losses in foreign jurisdictions for which no income tax benefit can be recognized.

Taxes on income decreased $1.1 million to $5.0 million in 2017 compared to $6.1 million in 2016. The effective tax rate in 2017 was unfavorably impacted by (i) charges associated with the TCJA, which resulted in additional income tax expense of $2.4 million. The expense is primarily related to the TCJA’s transition tax on previously unremitted earnings of non-U.S. subsidiaries offset by the release of a deferred tax liability on unremitted foreign earnings; (ii) significant pre-tax charges primarily related to goodwill impairment, which were not deductible for tax purposes; and (iii) the impact of establishing valuation allowances on deferred tax assets in jurisdictions where we are unlikely to recognize these benefits.

The effective tax rate in 2016 was positively impacted by: (i) a $4.2 million net benefit, or 11.8% benefit to the effective tax rate, related to reductions of previously recorded valuation allowances in the U.S., due to changes in the realization of future tax benefits and deferred tax composition changes; and (ii) a $2.6 million net benefit from foreign tax rate differences primarily related to earnings from Europe. Partially offsetting these benefits was: (i) a $1.4 million increase in the valuation allowance on certain net operating losses and deferred tax assets in foreign jurisdictions, primarily Europe; (ii) certain non-deductible tax items related to the 2016 Restructuring; and (iii) a higher mix of earnings toward U.S. jurisdictions, which generally have higher statutory tax rates.

Non-controlling Interests

Income and loss attributable to non-controlling interests was income of $0.2 million in 2018, income of $2.8 million in 2017 and a loss of $0.3 million in 2016. In 2018, income from our Corrosion Protection joint ventures in Oman, South Africa and Louisiana and our Infrastructure Solutions joint ventures in Asia were partially offset by losses from our Corrosion Protection joint venture in Mexico. In 2017, income was primarily driven from our joint venture in Louisiana, which performed a majority of its work on a large deepwater project in our pipe coating and insulation operation.

Liquidity and Capital Resources

Cash and Equivalents

	December 31,	
	2018	2017
	(in thousands)	
Cash and cash equivalents	$83,527	$105,717
Restricted cash	1,359	1,839

Restricted cash held in escrow primarily relates to funds reserved for legal requirements, deposits made in lieu of retention on specific projects performed for municipalities and state agencies, or advance customer payments and compensating balances for bank undertakings in Europe.

Sources and Uses of Cash

We expect the principal operational use of funds for the foreseeable future will be for capital expenditures, working capital, debt service and share repurchases.

During 2018, capital expenditures were primarily used to: (i) support our Infrastructure Solutions North American CIPP business, expand our Corrosion Protection businesses in the Middle East and provide growth capital for Energy Services; and (ii) boost our information systems platform with a new human capital management system and upgrades to our enterprise resource planning system. For 2019, we anticipate that we will spend approximately $25.0 million to $30.0 million for capital expenditures, which is slightly below 2018 spending levels.

In December 2018, our board of directors authorized the open market repurchase of up to two million shares of our common stock. The program did not establish a time period in which the repurchases had to be made. That authorization is now limited to $32.0 million in 2019 due to the December 2018 amendment to our Credit Facility. The shares are repurchased from time to time in the open market, subject to cash availability, market conditions and other factors, and in accordance with applicable regulatory requirements. We are not obligated to acquire any particular amount of common stock and, subject to applicable regulatory requirements, may commence, suspend or discontinue purchases at any time without notice or authorization. During 2018, we acquired 949,464 shares of our common stock for $20.3 million ($21.36 average price per share) through the open market repurchase program discussed above. In addition, we repurchased 228,068 shares of our common stock for $5.5 million ($24.07 average price per share) in connection with the satisfaction of tax obligations in connection with the vesting of restricted stock, restricted stock units and performance units. Any shares repurchased during 2019 are expected to be funded primarily through available cash. Once repurchased, we promptly retire such shares.

As part of our 2017 Restructuring, we utilized cash of $14.8 million during 2018 and $23.3 million in cumulative cash payments since 2017 related to employee severance, extension of benefits, employment assistance programs, early lease and contract termination and other restructuring related costs as we exit our non-pipe related contract applications for the Tyfo® system in North America, right-size our cathodic protection services operations in Canada and the Middle East, divest our Infrastructure Solutions businesses in Australia and Denmark, and reduce corporate and other operating costs. Cumulatively, we have incurred both cash and non-cash charges of $139.7 million, of which $86.4 million relates to goodwill and long-lived asset impairment charges recorded in 2017 as part of exiting the non-pipe FRP contracting market in North America. We expect to incur additional cash and non-cash charges of $15 million to $19 million during 2019.

As part of our 2016 Restructuring, we incurred $15.3 million in cash charges during 2016 related to employee severance, extension of benefits, employment assistance programs and early lease termination and other restructuring costs as we repositioned our Energy Services' upstream operations in California, right-sized Corrosion Protection to compete more effectively, and reduced corporate and other operating costs. We do not expect to incur any future cash costs related to the 2016 Restructuring.

At December 31, 2018, our cash balances were located worldwide for working capital and support needs. Given the breadth of our international operations, approximately $47.2 million, or 56.5%, of our cash was denominated in currencies other than the United States dollar as of December 31, 2018. We manage our worldwide cash requirements by reviewing available funds among the many subsidiaries through which we conduct business and the cost effectiveness with which those funds can be accessed. The repatriation of cash balances from certain of our subsidiaries could have adverse tax consequences or be subject to regulatory capital requirements; however, those balances are generally available without legal restrictions to fund ordinary business operations. As a result of the deemed mandatory repatriation provisions in the TCJA, we included $206.7 million of undistributed earnings in income subject to U.S. tax at reduced tax rates. Certain provisions within the TCJA effectively transition the U.S. to a territorial system and eliminates deferral on U.S. taxation for certain amounts of income that are not taxed at a minimum level. At this time, we do not intend to distribute earnings in a taxable manner, and therefore, intend to limit distributions to: (i) earnings previously taxed in the U.S.; (ii) earnings that would qualify for the 100 percent dividends received deduction provided in the TCJA; or (iii) earnings that would not result in significant foreign taxes. As a result, we did not recognize a deferred tax liability on any remaining undistributed foreign earnings at December 31, 2018.

Our primary source of cash is operating activities. We occasionally borrow under our line of credit's available capacity to fund operating activities, including working capital investments. Our operating activities include the collection of accounts receivable as well as the ultimate billing and collection of contract assets. At December 31, 2018, we believed our net accounts receivable and our contract assets, as reported on our Consolidated Balance Sheet, were fully collectible and a significant portion of the receivables will be collected within the next twelve months. From time to time, we have net receivables recorded that we believe will be collected but are being disputed by the customer in some manner. Disputes of this nature could meaningfully impact the timing of receivable collection or require us to invoke our contractual or legal rights in a lawsuit or alternative dispute resolution proceeding. If in a future period we believe any of these receivables are no longer collectible, we would increase our allowance for bad debts through a charge to earnings.

Cash Flows from Operating Activities

Cash flows from operating activities provided $39.7 million and $63.6 million in 2018 and 2017, respectively. The decrease in operating cash flow from 2018 to 2017 was primarily due to lower operating income during 2018 as compared to 2017, exclusive of significant non-cash charges in both periods. Additionally, cash flows during 2018 and 2017 were negatively impacted by $14.8 million and $9.4 million, respectively, in cash payments related to our restructuring activities. Cash flows in 2016 were negatively impacted by $15.3 million in cash payments related to our restructuring activities.

Net income recorded in 2018 was negatively impacted by non-cash charges of $24.4 million related to restructuring, impairments and the loss on sale of Bayou. The net loss recorded in 2017 was negatively impacted by non-cash charges of $96.5 million related to restructuring, definite-lived intangible asset impairments and goodwill impairments. Working capital used $35.4 million of cash during 2018 compared to $10.2 million used in 2017. This increased usage was primarily attributed to favorable customer prepayments in 2017 related to large Middle East coating projects executed in 2018.

Cash flows from operating activities provided $63.6 million and $71.2 million in 2017 and 2016, respectively. The decrease was due to the timing of customer payments on certain large projects and an overall growth in revenues during 2017 compared to 2016. Days sales outstanding increased by approximately ten days as of December 31, 2017 compared to December 31, 2016. However, excluding the impacts of the coating and insulation project activity at our Bayou Louisiana facility, days sales outstanding decreased by five days year over year, primarily due to stronger collections in all of our Corrosion Protection platform businesses and the customer prepayments related to Middle East coating projects mentioned above.

Cash Flows from Investing Activities

Cash flows from investing activities provided $1.2 million of cash in 2018 and used $39.5 million of cash in 2017. During 2018, we received $37.9 million from the sale of Bayou and we used $9.0 million for two smaller acquisitions. During 2017, we used approximately $8.0 million to acquire Environmental Techniques. During 2016, we used $96.3

million to acquire Underground Solutions, Fyfe Europe, the CIPP business of LMJ and Concrete Solutions. During 2016, we received proceeds of $6.6 million, net of cash disposed, from the sale of our interest in our Canadian pipe coating operation. We used $30.5 million in cash for capital expenditures in 2018 compared to $30.8 million in 2017 and $38.8 million in 2016. The higher levels in 2016 were primarily due to $13.5 million in capital expenditures related to constructing the new pipe coating and insulation plant in our Corrosion Protection segment. In 2018 and 2017, $0.9 million and $1.0 million, respectively, of non-cash capital expenditures were included in accounts payable and accrued expenses. Capital expenditures in 2018, 2017 and 2016 were partially offset by $3.0 million, $0.7 million and $3.3 million, respectively, in proceeds received from asset disposals.

Cash Flows from Financing Activities

Cash flows from financing activities used $60.4 million during 2018 compared to $56.4 million used in 2017. In 2018 and 2017, we used cash of $25.8 million and $37.8 million, respectively, to repurchase 1.2 million and 1.7 million shares, respectively, of our common stock through open market purchases and in connection with our equity compensation programs as discussed in Note 9 to the consolidated financial statements contained in this report. During 2018, we had net repayments on the line of credit of $7.0 million, which included a $35.0 million repayment from the proceeds on the Bayou sale, net of borrowings of $28.0 million for domestic working capital needs, and we used cash of $26.3 million to pay down the principal balance of our term loan. During 2017, we had net borrowings of $2.0 million from our line of credit to fund domestic working capital needs, and we used cash of $21.6 million to pay down the principal balance of our term loan. During 2016, we had net borrowings of $36.0 million from our line of credit primarily to fund our acquisition activity, and we used cash of $17.5 million to pay down the principal balance of our term loan. Additionally, we used cash of $44.5 million to repurchase 2.3 million shares of our common stock.

Long-Term Debt

In October 2015, we entered into an amended and restated $650.0 million senior secured credit facility with a syndicate of banks. In February 2018 and December 2018, we amended this facility (the “amended Credit Facility”). The amended Credit Facility consists of a $275.0 million five-year revolving line of credit and a $308.4 million five-year term loan facility, each with a maturity date in February 2023.

We paid expenses of $3.1 million associated with the amended Credit Facility, $1.4 million related to up-front lending fees and $1.7 million related to third-party arranging fees and expenses, the latter of which was recorded in “Interest expense” in the Consolidated Statement of Operations in 2018. In addition, we had $2.4 million in unamortized loan costs associated with the original Credit Facility, of which $0.6 million was written off and recorded in “Interest expense” in the Consolidated Statement of Operations in 2018.

Our indebtedness at December 31, 2018 consisted of $282.2 million outstanding from the $308.4 million term loan under the amended Credit Facility, $31.0 million on the line of credit under the amended Credit Facility and $1.0 million of third-party notes and bank debt.

As of December 31, 2018, we had $27.9 million in letters of credit issued and outstanding under the amended Credit Facility. Of such amount, $12.3 million was collateral for the benefit of certain of our insurance carriers and $15.5 million was for letters of credit or bank guarantees of performance or payment obligations of foreign subsidiaries.

In October 2015, we entered into an interest rate swap agreement for a notional amount of $262.5 million, which is set to expire in October 2020. The notional amount of this swap mirrors the amortization of a $262.5 million portion of our $350.0 million term loan drawn from the original Credit Facility. The swap requires us to make a monthly fixed rate payment of 1.46% calculated on the amortizing $262.5 million notional amount, and provides us to receive a payment based upon a variable monthly LIBOR interest rate calculated on the same amortizing $262.5 million notional amount. The receipt of the monthly LIBOR-based payment offsets a variable monthly LIBOR-based interest cost on a corresponding $262.5 million portion of our term loan from the original Credit Facility. This interest rate swap is used to partially hedge the interest rate risk associated with the volatility of monthly LIBOR rate movement and is accounted for as a cash flow hedge.

In March 2018, we entered into an interest rate swap forward agreement that begins in October 2020 and expires in February 2023 to coincide with the amortization period of the amended Credit Facility. The swap will require us to make a monthly fixed rate payment of 2.937% calculated on the then amortizing $170.6 million notional amount, and provides us to receive a payment based upon a variable monthly LIBOR interest rate calculated on the same amortizing $170.6 million notional amount. The receipt of the monthly LIBOR-based payment will offset the variable monthly LIBOR-based interest cost on a corresponding $170.6 million portion of our term loan from the amended Credit Facility. This interest rate swap will be used to partially hedge the interest rate risk associated with the volatility of monthly LIBOR rate movement and accounted for as a cash flow hedge.

The amended Credit Facility is subject to certain financial covenants including a consolidated financial leverage ratio and consolidated fixed charge coverage ratio. We were in compliance with all covenants at December 31, 2018 and expect continued compliance for the foreseeable future.

We believe that we have adequate resources and liquidity to fund future cash requirements and debt repayments with cash generated from operations, existing cash balances and additional short- and long-term borrowing capacity for the next 12 months.

See Note 8 to the consolidated financial statements contained in this Report for additional information and disclosures regarding our long-term debt.

Disclosure of Contractual Obligations and Commercial Commitments

We have entered into various contractual obligations and commitments in the course of our ongoing operations and financing strategies. Contractual obligations are considered to represent known future cash payments that we are required to make under existing contractual arrangements, such as debt and lease agreements. These obligations may result from both general financing activities or from commercial arrangements that are directly supported by related revenue-producing activities. Commercial commitments represent contingent obligations, which become payable only if certain pre-defined events were to occur, such as funding financial guarantees. See Note 12 to the consolidated financial statements contained in this Report for further discussion regarding our commitments and contingencies.

The following table provides a summary of our contractual obligations and commercial commitments as of December 31, 2018. This table includes cash obligations related to principal outstanding under existing debt agreements and operating leases (in thousands):

	Payments Due by Period						
Cash Obligations (1) (2) (3) (4) (5)	Total	2019	2020	2021	2022	2023	Thereafter
Long-term debt and notes payable	$314,219	$29,469	$32,033	$25,060	$30,844	$196,813	$ —
Interest on long-term debt	49,533	14,078	12,674	11,317	10,015	1,449	—
Operating leases	67,069	19,843	15,055	11,492	8,111	5,365	7,203
Total contractual cash obligations	$430,821	$63,390	$59,762	$47,869	$48,970	$203,627	$ 7,203

(1) Cash obligations are not discounted. See Notes 8 and 12 to the consolidated financial statements contained in this Report regarding our long-term debt and amended Credit Facility and commitments and contingencies, respectively.

(2) Interest on long-term debt was calculated using the current annualized rate on our long-term debt as discussed in Note 8 to the consolidated financial statements contained in this Report.

(3) Liabilities related to FASB ASC 740, Income Taxes, have not been included in the table above because we are uncertain as to if or when such amounts may be settled. As of December 31, 2018, we had income tax receivable and income tax payable of $6.6 million and $1.4 million, respectively, recorded on our consolidated balance sheet.

(4) There were no material purchase commitments at December 31, 2018.

(5) Amounts exclude approximately $7.0 million of cash charges expected to be incurred in 2019 related to the 2017 Restructuring.

Off-Balance Sheet Arrangements

We use various structures for the financing of operating equipment, including borrowings and operating leases. All debt is presented in the balance sheet. Our future commitments were $430.8 million at December 31, 2018. We have no other off-balance sheet financing arrangements or commitments. See Note 12 to the consolidated financial statements contained in this Report regarding commitments and contingencies.

Critical Accounting Policies

Discussion and analysis of our financial condition and results of operations are based upon our consolidated financial statements, which have been prepared in accordance with accounting principles generally accepted in the United States of America. The preparation of these financial statements requires us to make estimates and judgments that affect the reported amount of assets and liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities at the financial statement dates. Actual results may differ from these estimates under different assumptions or conditions.

Some accounting policies require the application of significant judgment by management in selecting the appropriate assumptions for calculating financial estimates. By their nature, these judgments are subject to an inherent degree of uncertainty. We believe that our critical accounting policies are those described below. For a detailed discussion on the application of these and other accounting policies, see Note 2 to the consolidated financial statements contained in this Report.

Revenue Recognition

On January 1, 2018, we adopted FASB ASC 606, Revenue from Contracts with Customers (“FASB ASC 606”) for all contracts that were not completed using the modified retrospective transition method. We recognized the cumulative effect of initially applying FASB ASC 606 as an adjustment to the opening balance of retained earnings. Prior period information has not been restated and continues to be reported under the accounting standards in effect for those periods.

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer, and is the unit of account in FASB ASC 606. A contract’s transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. For contracts in which construction, engineering and installation services are provided, there is generally a single performance obligation as the promise to transfer the individual goods or services is not separately identifiable from other promises in the contracts and, therefore, not distinct. The bundle of goods and services represents the combined output for which the customer has contracted. For product sales contracts with multiple performance obligations where each product is distinct, we allocate the contract's transaction price to each performance obligation using our best estimate of the standalone selling price of each distinct good in the contract. For royalty license agreements whereby intellectual property is transferred to the customer, there is a single performance obligation as the license is not separately identifiable from the other goods and services in the contract.

Our performance obligations are satisfied over time as work progresses or at a point in time. Revenues from construction, engineering and installation services are recognized over time using an input measure (e.g., costs incurred to date relative to total estimated costs at completion) to measure progress toward satisfying performance obligations. Incurred cost represents work performed, which corresponds with, and thereby best depicts, the transfer of control to the customer. Contract costs include labor, material, overhead and, when appropriate, general and administrative expenses. Revenues from maintenance contracts are structured such that we have the right to consideration from a customer in an amount that corresponds directly with the performance completed to date. Therefore, we utilize the practical expedient in FASB ASC 606-55-255, which allows us to recognize revenue in the amount to which we have the right to invoice. Revenues from royalty license arrangements are recognized either at contract inception when the license is transferred or when the royalty has been earned, depending on whether the contract contains fixed consideration. Revenues from stand-alone product sales are recognized at a point in time, when control of the product is transferred to the customer.

Accounting for long-term contracts involves the use of various techniques to estimate total contract revenue and costs. For long-term contracts, we estimate the profit on a contract as the difference between the total estimated revenue and expected costs to complete a contract, and recognizes that profit over the life of the contract. Contract estimates are based on various assumptions to project the outcome of future events that sometimes span multiple years. These assumptions include labor productivity and availability; the complexity of the work to be performed; the cost and availability of materials; the performance of subcontractors; and the availability and timing of funding from the customer.

Our contracts do not typically contain variable consideration or other provisions that increase or decrease the transaction price. In rare situations where the transaction price is not fixed, we estimate variable consideration at the most likely amount to which we expect to be entitled. We include estimated amounts 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. For royalty license agreements, we apply the sales-based and usage-based royalty exception and recognize royalties at the later of: (i) when the subsequent sale or usage occurs; or (ii) the satisfaction or partial satisfaction of the performance obligation to which some or all of the sales-or usage-based royalty has been allocated. For contracts in which a portion of the transaction price is retained and paid after the good or service has been transferred to the customer, we do not recognize a significant financing component. The primary purpose of the retainage payment is often to provide the customer with assurance that we will perform our obligations under the contract, rather than to provide financing to the customer.

Our estimates of variable consideration and determination of whether to include estimated amounts in the transaction price are based largely on an assessment of anticipated performance and all information (historical, current and forecasted) that is reasonably available.

Taxation

We provide for estimated income taxes payable or refundable on current year income tax returns, as well as the estimated future tax effects attributable to temporary differences and carryforwards, in accordance with FASB ASC 740, Income Taxes ("FASB ASC 740"). FASB ASC 740 also requires that a valuation allowance be recorded against any deferred tax assets that are not likely to be realized in the future. The determination is based on our ability to generate future taxable income and, at times, is dependent on our ability to implement strategic tax initiatives to ensure full utilization of recorded deferred tax assets. Should we not be able to implement the necessary tax strategies, we may need to record valuation allowances for certain deferred tax assets, including those related to foreign income tax benefits. Significant management judgment is required in determining the provision for income taxes, deferred tax assets and liabilities and any valuation allowances recorded against net deferred tax assets.

As a result of the TCJA's reduction in the U.S. corporate income tax rate from 35% to 21%, FASB ASC 740 required us to remeasure our deferred tax assets and liabilities based on tax rates at which the balances are expected to reverse in the future. The provisional amount recorded for the remeasurement of our deferred tax balances resulted in no adjustment to tax expense. The remeasurement of the deferred tax assets gave rise to an additional income tax expense of $5.1 million in 2017, which was offset by an equal reduction in the valuation allowance of $5.1 million.

In accordance with FASB ASC 740, tax benefits from an uncertain tax position may be recognized when it is more likely than not that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, based on the technical merits. In addition, this recognition model includes a measurement attribute that measures the position as the largest amount of tax that is greater than 50% likely of being realized upon ultimate settlement in accordance with FASB ASC 740. This interpretation also provides guidance on derecognition, classification, interest and penalties, accounting in interim periods, disclosure and transition.

We recognize tax liabilities in accordance with FASB ASC 740 and we adjust these liabilities when our judgment changes as a result of the evaluation of new information not previously available. Due to the complexity of some of these uncertainties, the ultimate resolution may result in a payment that is materially different from our current estimate of the tax liabilities. These differences will be reflected as increases or decreases to income tax expense in the period in which they are determined. While we believe the resulting tax balances as of December 31, 2018 and 2017 were appropriately accounted for in accordance with FASB ASC 740, the ultimate outcome of such matters could result in favorable or unfavorable adjustments to our consolidated financial statements and such adjustments could be material.

In 2017, in connection with our initial analysis of the TCJA, we recorded a provisional estimated net income tax expense of $2.4 million by applying the guidance under Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act (“SAB 118”). In accordance with SAB 118, the estimated income tax represented our best estimate at the time it was made, but also understanding that the provisional amount was subject to further adjustments under SAB 118. During 2018, we finalized our calculations of the transition tax liability under the TCJA and adjusted the liability downward by $1.9 million primarily due to further refinement of computations related to earnings and profits, cash and cash equivalents, state income tax and foreign withholding taxes pursuant to guidance issued during the year. This adjustment was recorded as a reduction to income tax expense in 2018.

Purchase Price Accounting

We account for our acquisitions in accordance with FASB ASC 805, Business Combinations. The base cash purchase price plus the estimated fair value of any non-cash or contingent consideration given for an acquired business is allocated to the assets acquired (including identified intangible assets) and liabilities assumed based on the estimated fair values of such assets and liabilities. The excess of the total consideration over the aggregate net fair values assigned is recorded as goodwill. Contingent consideration, if any, is recognized as a liability as of the acquisition date with subsequent adjustments recorded in the consolidated statements of operations. Indirect and general expenses related to business combinations are expensed as incurred.

We typically determine the fair value of tangible and intangible assets acquired in a business combination using independent valuations that rely on management’s estimates of inputs and assumptions that a market participant would use. Key assumptions include cash flow projections, growth rates, asset lives, and discount rates based on an analysis of weighted average cost of capital.

Long-Lived Assets

Property, plant and equipment and other identified intangibles (primarily customer relationships, patents and acquired technologies, trademarks, licenses and non-compete agreements) are recorded at cost, net of accumulated depreciation, amortization and impairment, and, except for goodwill, are depreciated or amortized on a straight-line basis over their estimated useful lives. Changes in circumstances such as technological advances, changes to our business model or changes in our capital strategy can result in the actual useful lives differing from our estimates. During 2018, no such changes were noted. If we determine that the useful life of our property, plant and equipment or our identified intangible assets should be shortened, we would depreciate or amortize the net book value in excess of the salvage value over its revised remaining useful life, thereby increasing depreciation or amortization expense.

Long-lived assets, including property, plant and equipment and other intangibles, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Such impairment tests are based on a comparison of undiscounted cash flows to the recorded value of the asset. The estimate of cash flow is based upon, among other things, assumptions about expected future operating performance. Our estimates of undiscounted cash flow may differ from actual cash flow due to, among other things, technological changes, economic conditions, changes to our business model or changes in our operating performance. If the sum of the undiscounted cash flows is less than the carrying value, we recognize an impairment loss, measured as the amount by which the carrying value exceeds the fair value of the asset.

Impairment Review – 2017

As part of the 2017 Restructuring, which was approved by our board of directors on July 28, 2017, we exited all non-pipe related contract applications for the Tyfo® system in North America. As a result of this action, we evaluated the long-lived assets of our Fyfe reporting unit, which caused us to review the financial performance of at-risk asset groups within that reporting unit in accordance with FASB ASC 360, Property, Plant and Equipment (“FASB ASC 360”). The results of the Fyfe reporting unit and its related asset groups are reported within the Infrastructure Solutions reportable segment.

The assets of an asset group represent the lowest level for which identifiable cash flows can be determined independent of other groups of assets and liabilities. The Fyfe North America asset group was the only at-risk asset group reviewed for impairment. We developed internal forward business plans under the guidance of local and regional leadership to determine the undiscounted expected future cash flows derived from Fyfe North America's long-lived assets. Such were based on management's best estimates considering the likelihood of various outcomes. Based on the internal projections, we determined that the sum of the undiscounted expected future cash flows for the Fyfe North America asset group was less than the carrying value of the assets, and as a result, engaged a third-party valuation firm to assist management in determining the fair value of long-lived assets for the Fyfe North America asset group.

In order to determine the impairment amount of long-lived assets, we first determined the fair value of each key component of our long-lived assets for the Fyfe North America asset group. The fair values were derived using various income-based approaches, which utilize discounted cash flows to evaluate the net earnings attributable to the asset being measured. Key assumptions used in assessment include the discount rate (based on weighted-average cost of capital), revenue growth rates, contributory asset charges, customer attrition, income tax rates and working capital needs, which were based on current market conditions and were consistent with internal management projections. Based on the results of the valuation, the carrying amount of certain long-lived assets for the Fyfe North America asset group exceeded the fair value. Accordingly, we recorded impairment charges of $3.4 million to trademarks, $20.8 million to customer relationships and $16.8 million to patents and acquired technology in the third quarter of 2017. The impairment charges were recorded to "Definite-lived intangible asset impairment" in the Consolidated Statement of Operations. Property, plant and equipment was determined to have a carrying value that exceeded fair value; thus, no impairment was recorded.

The fair value estimates described above were determined using observable inputs and significant unobservable inputs, which are based on level 3 inputs as defined in Note 13.

Goodwill

Under FASB ASC 350, we assess recoverability of goodwill on an annual basis or when events or changes in circumstances indicate that the carrying amount of goodwill may not be recoverable. An impairment charge will be recognized to the extent that the fair value of a reporting unit is less than its carrying value. Factors that could potentially trigger an impairment review include (but are not limited to):

- significant underperformance of a segment relative to expected, historical or forecasted operating results;
- significant negative industry or economic trends;
- significant changes in the strategy for a segment including extended slowdowns in the segment's market;
- a decrease in market capitalization below our book value; and
- a significant change in regulations.

Whether during the annual impairment assessment or during a trigger-based impairment review, we determine the fair value of our reporting units and compare such fair value to the carrying value of those reporting units to determine if there are any indications of goodwill impairment.

Fair value of reporting units is determined using a combination of two valuation methods: a market approach and an income approach with each method given equal weight in determining the fair value assigned to each reporting unit. Absent an indication of fair value from a potential buyer or similar specific transaction, we believe the use of these two methods provides a reasonable estimate of a reporting unit's fair value. Assumptions common to both methods are operating plans and economic outlooks, which are used to forecast future revenues, earnings and after-tax cash flows for each reporting unit. These assumptions are applied consistently for both methods.

The market approach estimates fair value by first determining earnings before interest, taxes, depreciation and amortization ("EBITDA") multiples for comparable publicly-traded companies with similar characteristics of the reporting unit. The EBITDA multiples for comparable companies are based upon current enterprise value. The enterprise value is based upon current market capitalization and includes a control premium. We believe this approach is appropriate because it provides a fair value estimate using multiples from entities with operations and economic characteristics comparable to its reporting units.

The income approach is based on forecasted future (debt-free) cash flows that are discounted to present value using factors that consider timing and risk of future cash flows. We believe this approach is appropriate because it provides a fair value estimate based upon the reporting unit's expected long-term operating cash flow performance. Discounted cash flow projections are based on financial forecasts developed from operating plans and economic outlooks, growth rates, estimates of future expected changes in operating margins, terminal value growth rates, future capital expenditures and changes in working capital requirements. Estimates of discounted cash flows may differ from actual cash flows due to, among other things, changes in economic conditions, changes to business models, changes in our weighted average cost of capital, or changes in operating performance.

The discount rate applied to the estimated future cash flows is one of the most significant assumptions utilized under the income approach. We determine the appropriate discount rate for each of its reporting units based on the weighted average cost of capital (“WACC”) for each individual reporting unit. The WACC takes into account both the pre-tax cost of debt and cost of equity (including the risk-free rate on twenty year U.S. Treasury bonds), and certain other company-specific and market-based factors. As each reporting unit has a different risk profile based on the nature of its operations, the WACC for each reporting unit is adjusted, as appropriate, to account for company-specific risks. Accordingly, the WACC for each reporting unit may differ.

Annual Impairment Assessment – October 1, 2018

We had six reporting units for purposes of assessing goodwill at October 1, 2018 as follows: Municipal Pipe Rehabilitation, Fyfe, Corrpro, United Pipeline Systems, Coating Services and Energy Services. During 2018, we acquired Hebna and P2S (see Note 1) and integrated them into the United Pipeline Systems and Energy Services reporting units, respectively.

Significant assumptions used in our October 2018 goodwill review included: (i) discount rates ranging from 13.0% to 16.0%; (ii) compound annual growth rates for revenues generally ranging from -3.2% to 4.8%; (iii) gross margin stability in the short term related to certain reporting units affected by the 2017 Restructuring, but slightly increased gross margins long term; (iv) peer group EBITDA multiples; and (v) terminal values for each reporting unit using a long-term growth rate of 1.0% to 3.0%.

Our assessment of each reporting unit’s fair value in relation to its respective carrying value yielded one reporting unit with a fair value within 15 percent of its carrying value and no reporting units with a fair value below carrying value or within 10 percent of its carrying value. The reporting unit with a fair value within 15 percent of its carrying value was the Energy Services reporting unit, which had $48.0 million of goodwill recorded at the impairment testing date. The Energy Services reporting unit has several large customers and primarily operates in the California downstream oil and gas market, which has experienced significant market changes in recent years Projected cash flows were based on continued strength in the Central California downstream energy market and a continued, growing relationship with our primary customer base. If these assumptions do not materialize in a manner consistent with our expectations, there is risk of impairment to recorded goodwill.

Impairment Review – 2017

As part of the 2017 Restructuring, which was approved by our board of directors on July 28, 2017, we exited all non-pipe related contract applications for the Tyfo® system in North America. As a result of this action, we evaluated the goodwill of our Fyfe reporting unit and determined that a triggering event occurred. As such, we engaged a third-party valuation firm to assist management in performing a goodwill impairment review for our Fyfe reporting unit during the third quarter of 2017. In accordance with the provisions of FASB ASC 350, we determined the fair value of the reporting unit and compared such fair value to the carrying value of the reporting unit. For the Fyfe reporting unit, carrying value, as adjusted for the long-lived asset impairments discussed previously, exceeded fair value by approximately 45%.

Despite our recent investments in sales resources to drive growth in North America, FRP technology has become more widely accepted and more contractors have become proficient with installation, which has begun to commoditize the application of the Tyfo® system during construction in the North American civil structure market. As a result of this and other factors, we decided to exit all non-pipe related contract applications for the Tyfo® system in North America. We are now focused on using our expertise in FRP technologies to promote third-party product sales, continuing pipe-related FRP installations and providing technical engineering support in the civil structural market in North America. The FRP operation in Asia remains largely unchanged as market conditions remain favorable.

Our decision, as noted above, lowered the expected future cash flows of the reporting unit. As a result, the values derived from both the income approach and the market approach decreased from the October 1, 2016 annual goodwill impairment analysis. The fair value for the Fyfe reporting unit decreased $105.2 million, or 65.3%, from the previous analysis. The impairment analysis assumed a weighted average cost of capital of 17.0%, which is higher than the 16.0% utilized in the October 1, 2016 review, primarily due to rising risk-free rates on twenty-year U.S. Treasury bonds. The company-specific factors influencing discount rates remained consistent in both analyses. The impairment analysis also assumed a long-term growth rate of 2.5%, which was reduced from 3.5% used in the October 1, 2016 review. This change reflects our expectations for future annual revenue growth, which were lowered from 10.8% in the previous analysis to 4.0%, primarily due to the downsizing of the North American operations. Expected gross margins were consistent between both analyses.

As of January 1, 2017, we adopted FASB Accounting Standards Update No. 2017-04, Simplifying the Test for Goodwill Impairment, which states that an impairment charge should be recognized for the amount by which the carrying amount exceeds the reporting unit’s fair value. Based on the impairment analysis, we determined that recorded goodwill at the Fyfe reporting unit was impaired by $45.4 million, which was recorded to “Goodwill impairment” in the Consolidated Statement of Operations during the third quarter of 2017. As of December 31, 2017, we had remaining Fyfe goodwill of $9.6 million.

Projected cash flows were based, in part, on the ability to grow third-party product sales and pressure pipe contracting in North America, and maintaining a presence in other international markets. If these assumptions do not materialize in a manner consistent with our expectations, there is risk of additional impairment to recorded goodwill.
See Note 7 to the consolidated financial statements contained in this Report for a reconciliation of the beginning and ending balances of goodwill.

Accounting Standards Updates

See Note 2 to the consolidated financial statements contained in this Report.

Item 7A. Quantitative and Qualitative Disclosures About Market Risk

Market Risk

We are exposed to the effect of interest rate changes and of foreign currency and commodity price fluctuations. We currently do not use derivative contracts to manage commodity risks. From time to time, we may enter into foreign currency forward contracts to fix exchange rates for net investments in foreign operations to hedge our foreign exchange risk.

Interest Rate Risk

The fair value of our cash and short-term investment portfolio at December 31, 2018 approximated carrying value. Given the short-term nature of these instruments, market risk, as measured by the change in fair value resulting from a hypothetical 100 basis point change in interest rates, would not be material.
Our objectives in managing exposure to interest rate changes are to limit the impact of interest rate changes on earnings and cash flows and to lower overall borrowing costs. To achieve these objectives, we maintain fixed rate debt whenever favorable; however, the majority of our debt at December 31, 2018 was variable rate debt. We substantially mitigate our interest rate risk through interest rate swap agreements, which are used to hedge the volatility of monthly LIBOR rate movement of our debt. We currently utilize interest rate swap agreements with a notional amount that mirrors approximately 75% of our outstanding borrowings from the term loan under our amended Credit Facility.
At December 31, 2018, the estimated fair value of our long-term debt was approximately $307.7 million. Fair value was estimated using market rates for debt of similar risk and maturity and a discounted cash flow model. Market risk related to the potential increase in fair value resulting from a hypothetical 100 basis point increase in our debt specific borrowing rates at December 31, 2018 would result in a $0.8 million increase in interest expense.

Foreign Exchange Risk

We operate subsidiaries and are associated with licensees and affiliated companies operating solely outside of the United States and in foreign currencies. Consequently, we are inherently exposed to risks associated with the fluctuation in the value of the local currencies compared to the U.S. dollar. At December 31, 2018, a substantial portion of our cash and cash equivalents was denominated in foreign currencies, and a hypothetical 10.0% change in currency exchange rates could result in an approximate $5.0 million impact to our equity through accumulated other comprehensive income (loss).
In order to help mitigate this risk, we may enter into foreign exchange forward contracts to minimize the short-term impact of foreign currency fluctuations. We do not engage in hedging transactions for speculative investment reasons. There can be no assurance that our hedging operations will eliminate or substantially reduce risks associated with fluctuating currencies. At December 31, 2018, there were no material foreign currency hedge instruments outstanding. See Note 13 to the consolidated financial statements contained in this Report for additional information and disclosures regarding our derivative financial instruments.

Commodity Risk

We have exposure to the effect of limitations on supply and changes in commodity pricing relative to a variety of raw materials that we purchase and use in our operating activities, most notably resin, iron ore, chemicals, staple fiber, fuel, metals and pipe. We manage this risk by entering into agreements with certain suppliers utilizing a request for proposal, or RFP, format and purchasing in bulk, and advantageous buying on the spot market for certain metals, when possible. We also manage this risk by continuously updating our estimation systems for bidding contracts so that we are able to price our products and services appropriately to our customers. However, we face exposure on contracts in process that have already been priced and are not subject to any cost adjustments in the contract. This exposure is potentially more significant on our longer-term projects.

We obtain a majority of our global resin requirements, one of our primary raw materials, from multiple suppliers in order to diversify our supplier base and thus reduce the risks inherent in concentrated supply streams. We have qualified a number of vendors in North America, Europe and Asia that can deliver, and are currently delivering, proprietary resins that meet our specifications.

The primary products and raw materials used by our infrastructure rehabilitation operations in the manufacture of FRP composite systems are carbon, glass, resins, fabric and epoxy raw materials. Fabric and epoxies are the largest materials purchased, which are currently purchased through a select group of suppliers, although we believe these and the other materials are available from a number of vendors. The price of epoxy historically is affected by the price of oil. In addition, a number of factors such as worldwide demand, labor costs, energy costs, import duties and other trade restrictions may influence the price of these raw materials.

We rely on a select group of third-party extruders to manufacture our Fusible PVC® pipe products.

Item 8. Financial Statements and Supplementary Data

INDEX TO CONSOLIDATED FINANCIAL STATEMENTS

Management's Report on Internal Control Over Financial Reporting

The Company's management is responsible for establishing and maintaining adequate internal control over financial reporting, as such term is defined in Exchange Act Rule 13a-15(f).

Under the supervision and with the participation of Company management, including the Chief Executive Officer (the principal executive officer) and the Chief Financial Officer (the principal financial officer), an evaluation was performed of the effectiveness of the Company's internal control over financial reporting as of December 31, 2018. In performing this evaluation, management employed the criteria set forth by the Committee of Sponsoring Organizations of the Treadway Commission in Internal Control – Integrated Framework (2013).

Based on the criteria set forth in Internal Control – Integrated Framework (2013), management, including the Company's Chief Executive Officer and its Chief Financial Officer, has concluded that the Company's internal control over financial reporting was effective as of December 31, 2018.

Because of 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.

The effectiveness of the Company's internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in its report which appears herein.

/s/ Charles R. Gordon
Charles R. Gordon
President and Chief Executive Officer
(Principal Executive Officer)

/s/ David F. Morris
David F. Morris
Executive Vice President and Chief Financial Officer
(Principal Financial Officer)

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Shareholders of Aegion Corporation:

Opinions on the Financial Statements and Internal Control over Financial Reporting

We have audited the accompanying consolidated balance sheets of Aegion Corporation and its subsidiaries (the "Company") as of December 31, 2018 and 2017, and the related consolidated statements of operations, comprehensive income, equity and cash flows for each of the three years in the period ended December 31, 2018, including the related notes (collectively referred to as the "consolidated financial statements"). We also have audited the Company's internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO).

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for each of the three years in the period ended December 31, 2018 in conformity with accounting principles generally accepted in the United States of America. Also in our opinion, the Company maintained, in all material respects, effective internal control over financial reporting as of December 31, 2018, based on criteria established in Internal Control - Integrated Framework (2013) issued by the COSO.

Basis for Opinions

The Company's management is responsible for these consolidated financial statements, for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express opinions on the Company's consolidated financial statements and on the Company's internal control over financial reporting 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 audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud, and whether effective internal control over financial reporting was maintained in all material respects.

Our audits of the consolidated financial statements included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that 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. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audits also included performing such other procedures as we considered necessary in the circumstances. We believe that our audits provide a reasonable basis for our opinions.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have

a material effect on the financial statements.
Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ PricewaterhouseCoopers LLP
St. Louis, Missouri
March 1, 2019

We have served as the Company's auditor since 2002.

AEGION CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF OPERATIONS
(in thousands, except per share amounts)

	Years Ended December 31,		
	2018	2017	2016
Revenues	$1,333,568	$1,359,019	$1,221,920
Cost of revenues	1,066,642	1,074,207	967,993
Gross profit	266,926	284,812	253,927
Operating expenses	219,823	226,173	197,897
Goodwill impairment	1,389	45,390	—
Definite-lived intangible asset impairment	2,169	41,032	—
Gain on litigation settlement	—	—	(6,625)
Acquisition and divestiture expenses	7,004	2,923	2,696
Restructuring and related charges	6,894	12,814	9,168
Operating income (loss)	29,647	(43,520)	50,791
Other income (expense):			
Interest expense	(17,327)	(16,001)	(15,029)
Interest income	516	145	166
Other	(9,881)	(2,201)	(694)
Total other expense	(26,692)	(18,057)	(15,557)
Income (loss) before taxes on income	2,955	(61,577)	35,234
Taxes (benefit) on income (loss)	(132)	5,005	6,109
Net income (loss)	3,087	(66,582)	29,125
Non-controlling interests (income) loss	(159)	(2,819)	328
Net income (loss) attributable to Aegion Corporation	$2,928	$(69,401)	$29,453
Earnings (loss) per share attributable to Aegion Corporation:			
Basic	$0.09	$(2.09)	$0.85
Diluted	$0.09	$(2.09)	$0.84

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

AEGION CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(in thousands)

	Years Ended December 31,		
	2018	2017	2016
Net income (loss)	$3,087	$(66,582)	$29,125
Other comprehensive income (loss):			
Currency translation adjustments	(14,651)	20,839	(6,343)
Deferred gain (loss) on hedging activity, net of tax[1]	(1,621)	1,402	746
Pension activity, net of tax[2]	(654)	93	(8)
Total comprehensive income (loss)	(13,839)	(44,248)	23,520
Comprehensive (income) loss attributable to non-controlling interests	(1)	(3,040)	294
Comprehensive income (loss) attributable to Aegion Corporation	$(13,840)	$(47,288)	$23,814

(1) Amounts presented net of tax of $(48), $930 and $496 for the years ended December 31, 2018, 2017 and 2016, respectively.

(2) Amounts presented net of tax of $(134), $22 and $(2) for the years ended December 31, 2018, 2017 and 2016, respectively.

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

AEGION CORPORATION AND SUBSIDIARIES
CONSOLIDATED BALANCE SHEETS
(in thousands, except share amounts)

	December 31, 2018	December 31, 2017
Assets		
Current assets		
Cash and cash equivalents	$83,527	$105,717
Restricted cash	1,359	1,839
Receivables, net of allowances of $9,695 and $5,775, respectively	204,541	201,570
Retainage	33,572	33,002
Contract assets	62,467	75,371
Inventories	56,437	63,969
Prepaid expenses and other current assets	32,172	35,282
Assets held for sale	7,792	70,314
Total current assets	481,867	587,064
Property, plant & equipment, less accumulated depreciation	107,059	109,040
Other assets		
Goodwill	260,633	260,715
Intangible assets, less accumulated amortization	119,696	132,345
Deferred income tax assets	1,561	1,666
Other assets	21,601	16,269
Total other assets	403,491	410,995
Total Assets	$992,417	$1,107,099
Liabilities and Equity		
Current liabilities		
Accounts payable	$64,562	$70,611
Accrued expenses	88,020	92,011
Contract liabilities	32,339	51,597
Current maturities of long-term debt	29,469	26,555
Liabilities held for sale	5,260	20,900
Total current liabilities	219,650	261,674
Long-term debt, less current maturities	282,003	318,240
Deferred income tax liabilities	8,361	9,211
Other non-current liabilities	12,216	12,918
Total liabilities	522,230	602,043
(See Commitments and Contingencies: Note 12)		
Equity		
Preferred stock, undesignated, $.10 par – shares authorized 2,000,000; none outstanding	—	—
Common stock, $.01 par – shares authorized 125,000,000; shares issued and outstanding 31,922,409 and 32,462,542, respectively	319	325
Additional paid-in capital	122,818	140,749
Retained earnings	379,890	376,694
Accumulated other comprehensive loss	(40,290)	(23,522)
Total stockholders’ equity	462,737	494,246
Non-controlling interests	7,450	10,810

Total equity	470,187	505,056
Total Liabilities and Equity	$992,417	$1,107,099

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

AEGION CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF EQUITY
(in thousands, except number of shares)

	Common Stock						
	Shares	Amount	Additional Paid-In Capital	Retained Earnings	Accumulated Other Comprehensive Income (Loss)	Non-Controlling Interests	Total Equity
BALANCE, December 31, 2015	36,053,499	$ 361	$ 200,255	$ 416,642	$ (39,996)	$ 16,531	$ 593,793
Net income (loss)	—	—	—	29,453	—	(328)	29,125
Issuance of common stock upon stock option exercises, including tax benefit	114,307	1	1,817	—	—	—	1,818
Issuance of shares pursuant to restricted stock units	141,507	1	—	—	—	—	1
Issuance of shares pursuant to deferred stock unit awards	39,660	—	—	—	—	—	—
Forfeitures of restricted shares	(42,775)	—	—	—	—	—	—
Shares repurchased and retired	(2,349,894)	(23)	(44,431)	—	—	—	(44,454)
Equity-based compensation expense	—	—	10,059	—	—	—	10,059
Sale of non-controlling interest	—	—	—	—	—	(7,278)	(7,278)
Distributions to non-controlling interest	—	—	—	—	—	(1,276)	(1,276)
Currency translation adjustment and derivative transactions, net	—	—	—	—	(5,639)	34	(5,605)
BALANCE, December 31, 2016	33,956,304	$ 340	$ 167,700	$ 446,095	$ (45,635)	$ 7,683	$ 576,183
Net income (loss)	—	—	—	(69,401)	—	2,819	(66,582)
Issuance of common stock upon stock option exercises, including tax benefit	43,573	—	822	—	—	—	822
Issuance of shares pursuant to restricted stock units	95,510	1	—	—	—	—	1
Issuance of shares pursuant to performance units	49,672	—	—	—	—	—	—
Issuance of shares pursuant to deferred stock unit awards	30,559	—	—	—	—	—	—
Forfeitures of restricted shares	(1,084)	—	—	—	—	—	—
Shares repurchased and retired	(1,711,992)	(16)	(37,833)	—	—	—	(37,849)
Equity-based compensation expense	—	—	10,060	—	—	—	10,060
Investments from non-controlling interest	—	—	—	—	—	158	158
Distributions to non-controlling interests	—	—	—	—	—	(71)	(71)
Currency translation adjustment and derivative transactions, net	—	—	—	—	22,113	221	22,334
BALANCE, December 31, 2017	32,462,542	$ 325	$ 140,749	$ 376,694	$ (23,522)	$ 10,810	$ 505,056
	—	—	—	268	—	—	268

Cumulative effect adjustment (see Revenues: Note 3)							
Net income (loss)	—	—	—	2,928	—	159	3,087
Issuance of shares pursuant to restricted stock units	312,182	3	—	—	—	—	3
Issuance of shares pursuant to performance units	296,909	3	—	—	—	—	3
Issuance of shares pursuant to deferred stock unit awards	28,308	—	—	—	—	—	—
Shares repurchased and retired	(1,177,532)	(12)	(25,769)	—	—	—	(25,781)
Equity-based compensation expense	—	—	7,838	—	—	—	7,838
Sale of non-controlling interest	—	—	—	—	—	(3,361)	(3,361)
Currency translation adjustment and derivative transactions, net	—	—	—	—	(16,768)	(158)	(16,926)
BALANCE, December 31, 2018	31,922,409	$ 319	$ 122,818	$ 379,890	$ (40,290)	$ 7,450	$ 470,187

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

67

AEGION CORPORATION AND SUBSIDIARIES
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Years Ended December 31,		
	2018	2017	2016
Cash flows from operating activities:			
Net income (loss)	$3,087	$(66,582)	$29,125
Adjustments to reconcile to net cash provided by operating activities:			
Depreciation and amortization	37,855	44,419	46,719
(Gain) loss on sale of fixed assets	143	(59)	(1,916)
Equity-based compensation expense	7,838	10,060	10,059
Deferred income taxes	(648)	(9,376)	1,772
Non-cash restructuring charges	13,814	10,080	300
Non-cash portion of litigation settlement	—	—	(3,000)
Goodwill impairment	1,389	45,390	—
Definite-lived intangible asset impairment	2,169	41,032	—
Loss on sale of businesses	7,048	—	—
Loss on foreign currency transactions	623	2,152	911
Other	1,278	(1,562)	(1,044)
Changes in operating assets and liabilities (net of acquisitions):			
Receivables net, retainage and contract assets	(6,821)	(29,847)	52,774
Inventories	2,306	(1,926)	(2,569)
Prepaid expenses and other assets	614	8,732	16,759
Accounts payable and accrued expenses	(7,339)	18,803	(50,022)
Contract liabilities	(24,144)	(5,924)	(27,761)
Other operating	457	(1,798)	(946)
Net cash provided by operating activities	39,669	63,594	71,161
Cash flows from investing activities:			
Capital expenditures	(30,514)	(30,830)	(38,760)
Proceeds from sale of fixed assets	3,036	707	3,310
Patent expenditures	(299)	(379)	(1,043)
Purchase of Underground Solutions, Inc., net of cash acquired	—	—	(84,740)
Other acquisition activity, net of cash acquired	(9,000)	(9,045)	(11,567)
Sale of Bayou, net of cash disposed	37,942	—	—
Sale of interest in Bayou Perma-Pipe Canada, Ltd., net of cash disposed	—	—	6,599
Net cash provided by (used in) investing activities	1,165	(39,547)	(126,201)

Cash flows from financing activities:			
Proceeds from issuance of common stock upon stock option exercises, including tax effects	—	823	1,818
Repurchase of common stock	(25,775)	(37,849)	(44,454)
Investments from non-controlling interest	—	158	—
Purchase of or distributions to non-controlling interests	—	(71)	(1,276)
Payment of contingent consideration	—	(500)	(500)
Credit facility amendment fees	(1,657)	—	—
Proceeds from notes payable, net	234	639	—
Proceeds from (payments on) line of credit, net	(7,000)	2,000	36,000
Principal payments on long-term debt	(26,250)	(21,647)	(17,500)
Net cash used in financing activities	(60,448)	(56,447)	(25,912)
Effect of exchange rate changes on cash	(4,045)	6,553	(2,148)
Net decrease in cash, cash equivalents and restricted cash for the year	(23,659)	(25,847)	(83,100)
Cash, cash equivalents and restricted cash, beginning of year	108,545	134,392	217,492
Cash, cash equivalents and restricted cash, end of year	84,886	108,545	134,392
Cash, cash equivalents and restricted cash, assets held for sale, end of year	—	(989)	—
Cash, cash equivalents and restricted cash, end of year	$84,886	$107,556	$134,392
Supplemental disclosures of cash flow information:			
Cash paid (received) for:			
Interest	$15,622	$14,998	$11,118
Income taxes	4,625	5,649	(517)

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

69

AEGION CORPORATION AND SUBSIDIARIES
NOTES TO CONSOLIDATED FINANCIAL STATEMENTS

1. DESCRIPTION OF BUSINESS

Aegion Corporation combines innovative technologies with market leading expertise to maintain, rehabilitate and strengthen pipelines and other infrastructure around the world. Since 1971, the Company has played a pioneering role in finding transformational solutions to rehabilitate aging infrastructure, primarily pipelines in the wastewater, water, energy, mining and refining industries. The Company also maintains the efficient operation of refineries and other industrial facilities and provide innovative solutions for the strengthening of buildings, bridges and other structures. Aegion is committed to Stronger. Safer. Infrastructure®. The Company believes that the depth and breadth of its products and services platform make Aegion a leading "one-stop" provider for the world's infrastructure rehabilitation and protection needs.

The Company is primarily built on the premise that it is possible to use technology to extend the structural design life and maintain, if not improve, the performance of infrastructure, mostly pipe. The Company is proving that this expertise can be applied in a variety of markets to protect pipelines in oil, gas, mining, wastewater and water applications and extending this to the rehabilitation and maintenance of commercial structures and the provision of professional services in energy-related industries. Many types of infrastructure must be protected from the corrosive and abrasive materials that pass through or near them. The Company's expertise in non-disruptive corrosion engineering and abrasion protection is now wide-ranging, opening new markets for growth. The Company has a long history of product development and intellectual property management. The Company manufactures most of the engineered solutions it creates as well as the specialized equipment required to install them. Finally, decades of experience give the Company an advantage in understanding municipal, energy, mining, industrial and commercial customers. Strong customer relationships and brand recognition allow the Company to support the expansion of existing and innovative technologies into new high growth end markets.

The Company's predecessor was originally incorporated in Delaware in 1980 to act as the exclusive United States licensee of the Insituform® cured-in-place pipe ("CIPP") process, which Insituform's founder invented in 1971. The Insituform® CIPP process served as the first trenchless technology for rehabilitating sewer pipelines and has enabled municipalities and private industry to avoid the extraordinary expense and extreme disruption that can result from conventional "dig-and-replace" methods. For more than 45 years, the Company has maintained its leadership position in the CIPP market from manufacturing to technological innovations and market share.

In order to strengthen the Company's ability to service the emerging demands of the infrastructure protection market and to better position the Company for sustainable growth, the Company embarked on a diversification strategy in 2009 to expand its product and service portfolio and its geographical reach. Through a series of strategic initiatives and key acquisitions, the Company now possesses a broad portfolio of cost-effective solutions for rehabilitating and maintaining aging or deteriorating infrastructure, protecting new infrastructure from corrosion worldwide and providing integrated professional services in engineering, procurement, construction, maintenance, and turnaround services for oil and natural gas companies, primarily in the midstream and downstream markets.

Recognizing that the breadth of offerings expanded beyond the Company's flagship Insituform® brand, which constituted less than half of the Company's revenues in 2011, the Company reorganized Insituform Technologies, Inc. ("Insituform"), the parent company at the time, into a new holding company structure in October 2011. Aegion became the new parent company and Insituform became a wholly-owned subsidiary of Aegion. Aegion reflects the Company's mission of extending its leadership capabilities to furnish products and services to provide: (i) long-term protection for water and wastewater pipes, oil and gas pipelines and infrastructure as well as commercial and governmental structures and transportation infrastructure; and (ii) integrated professional services to energy companies.

Revision

The Company identified errors related to intercompany accounts, stock compensation and accrued contract costs prior to December 31, 2015 of approximately $8.9 million and corrected these errors as a cumulative decrease to beginning retained earnings of $8.9 million with a corresponding increase to accrued expenses, additional paid-in capital and accumulated other comprehensive loss of $0.8 million, $0.3 million and $7.8 million, respectively, as of December 31,

2015. The Company also revised the results for 2017 and 2016 to reflect the correction of these errors, resulting in: (i) a net increase to operating expenses of $0.3 million and a corresponding decrease in net income (loss) for 2017; (ii) an increase to currency translation adjustments, which is a component of accumulated other comprehensive loss, of $1.4 million for 2017; (iii) a decrease of $1.1 million and an increase of $0.8 million related to equity-based compensation expense for 2017 and 2016, respectively; and (iv) a decrease to cost of revenues of $0.8 million and an increase to operating expenses of $0.8 million for 2016. The Company also revised net cash provided by operating activities, which resulted in a decrease of $1.4 million for 2017.

The Company evaluated the impact of these errors on the prior period quarterly and annual financial statements, assessing materiality both quantitatively and qualitatively. The Company determined that these errors were not material to any of the Company's prior annual and interim period consolidated financial statements and therefore, amendments of previously filed reports were not required. As such, the revision for the corrections is reflected in the financial information of the applicable prior periods in this Form 10-K filing and disclosure of the revised amount on other prior periods will be reflected in future filings containing the applicable period.

Acquisitions/Strategic Initiatives/Divestitures

2017 Restructuring

On July 28, 2017, the Company's board of directors approved a realignment and restructuring plan (the "2017 Restructuring"). As part of the 2017 Restructuring, the Company announced plans to: (i) divest the Company's pipe coating and insulation businesses in Louisiana, The Bayou Companies, LLC and Bayou Wasco Insulation, LLC (collectively "Bayou"; (ii) exit all non-pipe related contract applications for the Tyfo® system in North America; (iii) right-size the cathodic protection services operation in Canada and the CIPP businesses in Australia and Denmark; and (iv) reduce corporate and other operating costs.

During 2018, the Company's board of directors approved additional actions with respect to the 2017 Restructuring, which included the decisions to: (i) divest the Australia and Denmark CIPP businesses; (ii) take actions to further optimize operations within North America, including measures to reduce consolidated operating costs; and (iii) divest or otherwise exit multiple additional international businesses. See Note 4.

2016 Restructuring

On January 4, 2016, the Company's board of directors approved a restructuring plan (the "2016 Restructuring") to reduce the Company's exposure to the upstream oil markets and to reduce consolidated expenses. The 2016 Restructuring repositioned Energy Services' upstream operations in California, reduced Corrosion Protection's upstream exposure by divesting its interest in a Canadian pipe coating joint venture, right-sized Corrosion Protection to compete more effectively and reduced corporate and other operating costs. The Company completed all of the aforementioned objectives related to the 2016 Restructuring. See Note 4.

Infrastructure Solutions Segment ("Infrastructure Solutions")

On November 1, 2018, the Company sold substantially all of the fixed assets and inventory from its CIPP operations in Denmark for a sale price of DKK 10.5 million (approximately $1.6 million). In connection with the sale, the Company entered into a five-year exclusive tube-supply agreement whereby the buyers will purchase Insituform® CIPP liners from the Company. The buyers are also entitled to use the Insituform® trade name based on a trademark license granted for the same five-year time period.

On May 14, 2018, the Company's board of directors approved a plan to divest the Company's CIPP business in Australia. While restructuring actions in Australia led to year-over-year improvements in operating results in 2018, an assessment of the long-term fit within the Company's portfolio led to the decision to divest the business. Accordingly, the Company has classified Australia's assets and liabilities as held for sale on the Consolidated Balance Sheet at December 31, 2018. See Note 6.

On March 1, 2017, the Company acquired Environmental Techniques Limited and its parent holding company, Killeen Trading Limited (collectively "Environmental Techniques"), for a purchase price of £6.5 million, approximately $8.0 million, which was funded from the Company's international cash balances. Environmental Techniques provides trenchless drainage inspection, cleaning and rehabilitation services throughout the United Kingdom and the Republic of Ireland.

On July 1, 2016, the Company acquired Concrete Solutions Limited ("CSL") and Building Chemical Supplies Limited ("BCS"), two New Zealand companies (collectively, "Concrete Solutions"), for a purchase price paid at closing of NZD 7.5 million, approximately $5.5 million, which was funded from the Company's cash balances. The sellers have the ability to earn up to an additional NZD 2.0 million, approximately $1.4 million, of proceeds based on reaching certain future performance targets. CSL provides structural strengthening, concrete repair and bridge jointing solutions primarily through application of FRP and injection resins and had served as a Tyfo® system certified applicator in New Zealand since the late 1990's. BCS imports and distributes materials, including fiber reinforced polymer, injection resins, repair mortars and protective coatings.

On June 2, 2016, the Company acquired the CIPP contracting operations of Leif M. Jensen A/S (“LMJ”), a Danish company and the Insituform licensee in Denmark since 2011. The purchase price was €2.9 million, approximately $3.2 million, and was funded from the Company’s cash balances.
On May 13, 2016, the Company acquired the operations and territories of Fyfe Europe S.A. and related companies (“Fyfe Europe”) for a purchase price of $3.0 million. The transaction was funded from the Company’s cash balances.
Fyfe Europe

held rights to provide Fyfe® product engineering and support to installers and applicators of FRP systems in 72 countries throughout Europe, the Middle East and North Africa. The acquisition of these territories provides the Company with worldwide rights to market, manufacture and install the patented Tyfo® technology.

On February 18, 2016, the Company acquired Underground Solutions, Inc. and its subsidiary, Underground Solutions Technologies Group, Inc. (collectively, "Underground Solutions"), for an initial purchase price of $85.0 million plus an additional $5.0 million for the value of the estimated tax benefits associated with Underground Solutions' net operating loss carry forwards. The purchase price included $6.3 million held in escrow as security for the post-closing purchase price adjustments and post-closing indemnification obligations of Underground Solutions' previous owners. The transaction was funded partially from the Company's cash balances and partially from borrowings under the Company's revolving credit facility. To supplement the domestic cash balances, the Company repatriated approximately $29.7 million from foreign subsidiaries to assist in funding the transaction, incurring approximately $3.2 million in additional taxes, an accrual for which was included in the Company's tax provision amounts for 2015. Underground Solutions provides infrastructure technologies for water, sewer and conduit applications.

Corrosion Protection Segment ("Corrosion Protection")

On August 31, 2018, the Company sold substantially all of the assets of its wholly-owned subsidiary, The Bayou Companies, LLC and its fifty-one percent (51%) interest in Bayou Wasco Insulation, LLC. The sale price was $46 million, consisting of $38 million paid in cash at closing and $8 million in a fully secured, two-year loan payable to Aegion. Aegion is also eligible to receive an additional $4 million in total earn-out payments based on performance of the divested businesses in 2019 and 2020. Cash proceeds, net of customary closing costs, were used to repay outstanding borrowings on the Company's line of credit. The sale resulted in a pre-tax loss of $7.0 million during 2018, which was corrected from the $8.7 million previously reported in the third quarter of 2018. The loss is included in "Other expense" in the Consolidated Statements of Operations.

On May 4, 2018, the Company acquired the operations of Hebna Inc., Hebna Canada Inc. and Hebna Corporation (collectively "Hebna"), for a total purchase price of $6.0 million ($3.0 million was paid during the second quarter of 2018 and $3.0 million was paid during the third quarter of 2018). The transaction was funded from a combination of domestic and international cash balances, with fifty percent (50%) of the purchase price being paid by the Company's joint venture in Oman, in which the Company is a fifty-one percent (51%) partner. Hebna provides pipeline lining services, including compressed-fit lining, slip-lining, liner and free-standing pipe fusing, pipeline assessment and integrity management, pipeline pigging and calibration, and roto-lining services primarily in the United States, Canada and Middle East.

In September 2017, the Company organized Aegion South Africa Proprietary Limited, a joint venture in South Africa between Aegion International Holdings Limited, a subsidiary of the Company ("Aegion International"), and Robor Proprietary Limited ("Robor"), for the purpose of providing Aegion's Corrosion Protection and Infrastructure Solutions products and services to Eastern and Southern Africa. Aegion International owns sixty percent (60%) of the joint venture and Robor owns the remaining forty percent (40%).

On February 1, 2016, the Company sold its fifty-one percent (51%) interest in its Canadian pipe-coating joint venture, Bayou Perma-Pipe Canada, Ltd. ("BPPC"), to its joint venture partner, Perma-Pipe, Inc. The sale price was $9.6 million, which consisted of a $7.6 million payment at closing and a $2.0 million promissory note, which was paid in full on July 28, 2016. BPPC served as the Company's pipe coating and insulation operation in Canada.

Energy Services Segment ("Energy Services")

On July 20, 2018, the Company acquired the operations of Plant Performance Services LLC and P2S LLC (collectively "P2S"), for a total purchase price of $3.0 million. The transaction was funded from domestic cash balances. P2S specializes in general mechanical turnaround services, specialty welding services and field fabrication services primarily for the downstream oil and gas industry.

Purchase Price Accounting

The Company finalized its accounting for Environmental Techniques in 2018 and Underground Solutions, Fyfe Europe, LMJ and Concrete Solutions in 2017. There were no significant adjustments to the purchase price accounting in either period. The goodwill and definite-lived intangible assets associated with the Fyfe Europe, LMJ and Concrete Solutions acquisitions are deductible for tax purposes; whereas, the goodwill and definite-lived intangible assets associated with the Environmental Techniques and Underground Solutions acquisitions are not deductible for tax purposes.

The Company's acquisitions made the following contributions to its revenues and profits (in thousands):

	Year Ended December 31,					
	2018		2017		2016	
	Revenues	Net Loss	Revenues	Net Loss	Revenues	Net Loss
Underground Solutions [1]	$45,738	$(790)	$32,063	$(3,778)	$29,425	$(2,694)
Other acquisitions [2][3]	17,315	(555)	14,845	(5,225)	7,588	(1,811)

"N/A" represents not applicable.

(1) The reported net loss in 2018 includes a pre-tax allocation of corporate expenses of $5.0 million. The reported net loss in 2017 includes a pre-tax allocation of corporate expenses of $4.5 million. The reported net loss in 2016 includes a pre-tax charge for inventory step-up of $3.6 million, recognized as part of the accounting for business combinations, and a pre-tax allocation of corporate expenses of $3.2 million.

(2) The reported net loss in 2018 and 2017 includes pre-tax restructuring charges of $4.8 million and $0.1 million, respectively.

(3) The reported net loss in 2017 includes a pre-tax impairment charge of $2.2 million allocated from goodwill impairments in the Fyfe reporting unit (see Note 2).

The following unaudited pro forma summary presents combined information of the Company as if its acquisitions had occurred at the beginning of the year preceding their acquisition (in thousands, except earnings per share):

	Years Ended December 31,	
	2017[1]	2016[2]
Revenues	$1,359,901	$1,238,730
Net income (loss) [3]	(69,574)	29,924
Diluted earnings (loss) per share	$(2.10)	$0.85

(1) Includes pro-forma results related to Environmental Techniques, Hebna and P2S. 2018 contributions related to Hebna and P2S were immaterial.

(2) Includes pro-forma results related to Environmental Techniques, Underground Solutions, Fyfe Europe, LMJ and Concrete Solutions.

(3) Includes pro-forma adjustments for depreciation and amortization associated with acquired tangible and intangible assets, as if those assets were recorded at the beginning of the year preceding the acquisition date.

The transaction purchase price to acquire Environmental Techniques was £6.5 million, approximately $8.0 million, which represented cash consideration paid at closing.

The transaction purchase price to acquire Underground Solutions was $88.4 million, which included: (i) a payment at closing of $85.0 million; (ii) a payment of $5.0 million for the value of the estimated tax benefits associated with Underground Solutions' net operating loss carry forwards; and (iii) working capital adjustments of $1.6 million payable to the Company.

The transaction purchase price to acquire Fyfe Europe was $3.0 million, which represented cash consideration paid at closing of $2.8 million plus $0.2 million of deferred contingent consideration, which was paid during 2017.

The transaction purchase price to acquire LMJ was €2.9 million, approximately $3.2 million, which was paid at closing.

The transaction purchase price to acquire Concrete Solutions was NZD 8.9 million, approximately $6.4 million, which included: (i) a payment at closing of NZD 7.5 million, approximately $5.5 million; (ii) a preliminary working capital adjustment payable to the sellers of NZD 0.2 million, approximately $0.1 million; and (iii) the estimated fair value of earnout consideration of NZD 1.2 million, approximately $0.9 million. During 2018 and 2017, the Company reversed $0.3 million and $0.1 million, respectively, of the earnout consideration as operating results for the twelve-month periods ended June 30, 2018 and 2017 were below the target amounts in the purchase agreement. The accrual adjustments resulted in an offset to “Operating expenses” in the Consolidated Statement of Operations for each respective year. After the accrual adjustments, the estimated fair value of the contingent consideration was NZD 0.6 million, approximately $0.4 million. The fair value estimate was determined using observable inputs and significant unobservable inputs, which are based on level 3 inputs as defined in Note 13.

The following table summarizes the fair value of identified assets and liabilities of the Company's acquisitions at their acquisition dates (in thousands):

	Underground Solutions	Other Acquisitions[1]
Cash	$ 3,630	$ —
Receivables and contract assets	6,339	2,270
Inventories	12,629	2,642
Prepaid expenses and other current assets	671	111
Property, plant and equipment	2,755	5,216
Identified intangible assets	33,370	8,523
Deferred income tax assets	13,282	124
Other assets	90	—
Accounts payable	(4,653)	(1,862)
Accrued expenses	(5,900)	(335)
Contract liabilities	(2,943)	—
Deferred tax liabilities	(14,562)	(895)
Total identifiable net assets	$ 44,708	$ 15,794
Total consideration recorded	$ 88,370	$ 29,674
Less: total identifiable net assets	44,708	15,794
Final purchase price goodwill	$ 43,662	$ 13,880

[1] Total includes P2S, Hebna, Environmental Techniques, Fyfe Europe, LMJ and Concrete Solutions.

2. ACCOUNTING POLICIES

Principles of Consolidation

The consolidated financial statements include the accounts of the Company, its wholly-owned subsidiaries and majority-owned subsidiaries in which the Company is deemed to be the primary beneficiary. All significant intercompany transactions and balances have been eliminated.

Accounting Estimates

The preparation of financial statements in conformity with accounting principles generally accepted in the United States 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 revenues and expenses during the reporting period. Actual results could differ from those estimates.

Foreign Currency

For the Company's international subsidiaries, the local currency is generally the functional currency. Assets and liabilities of these subsidiaries are translated into U.S. dollars using rates in effect at the balance sheet date while revenues and expenses are translated into U.S. dollars using average exchange rates. The cumulative translation adjustment resulting from changes in exchange rates are included in the Consolidated Balance Sheets as a component of "Accumulated other comprehensive loss" in total stockholders' equity.

The Company's accumulated other comprehensive loss is comprised of three main components: (i) currency translation; (ii) derivatives; and (iii) gains and losses associated with the Company's defined benefit plan in the United Kingdom (in thousands):

	December 31,	
	2018	2017
Currency translation adjustments [1]	$(41,107)	$(26,614)
Derivative hedging activity	1,715	3,336
Pension activity	(898)	(244)
Total accumulated other comprehensive loss	$(40,290)	$(23,522)

Net foreign exchange transaction losses of $0.6 million, $2.2 million and $0.9 million for 2018, 2017 and 2016, respectively, are included in "Other expense" in the Consolidated Statements of Operations.

Research and Development

The Company expenses research and development costs as incurred. Research and development costs of $5.6 million, $4.2 million and $4.7 million for the years ended December 31, 2018, 2017 and 2016, respectively, are included in "Operating expenses" in the consolidated statements of operations.

Taxation

The Company provides for estimated income taxes payable or refundable on current year income tax returns as well as the estimated future tax effects attributable to temporary differences and carryforwards, based upon enacted tax laws and tax rates, and in accordance with FASB ASC 740, Income Taxes ("FASB ASC 740"). FASB ASC 740 also requires that a valuation allowance be recorded against any deferred tax assets that are not likely to be realized in the future. The determination is based on the Company's ability to generate future taxable income and, at times, is dependent on its ability to implement strategic tax initiatives to ensure full utilization of recorded deferred tax assets. Should the Company not be able to implement the necessary tax strategies, it may need to record valuation allowances for certain deferred tax assets, including those related to foreign income tax benefits. Significant management judgment is required in determining the provision for income taxes, deferred tax assets and liabilities and any valuation allowances recorded against net deferred tax assets.

As a result of the reduction in the U.S. corporate income tax rate from 35% to 21% under the Tax Cuts and Jobs Act ("TCJA"), FASB ASC 740 required the Company to remeasure its deferred tax assets and liabilities based on tax rates at which the balances are expected to reverse in the future. The amount recorded for the remeasurement of the Company's deferred tax balances resulted in no adjustment to income tax expense. The remeasurement of the deferred tax assets gave rise to an additional income tax expense of $5.1 million in 2017, which was offset by an equal reduction in the valuation allowance of $5.1 million.

In accordance with FASB ASC 740, tax benefits from an uncertain tax position may be recognized when it is more likely than not that the position will be sustained upon examination, including resolutions of any related appeals or litigation processes, based on the technical merits. In addition, this recognition model includes a measurement attribute that measures the position as the largest amount of tax that is greater than 50% likely of being realized upon ultimate settlement in accordance with FASB ASC 740. This interpretation also provides guidance on derecognition, classification, interest and penalties, accounting in interim periods, disclosure and transition.

The Company recognizes tax liabilities in accordance with FASB ASC 740 and adjusts these liabilities when judgment changes as a result of the evaluation of new information not previously available. Due to the complexity of some of these uncertainties, the ultimate resolution may result in a payment that is materially different from the current estimate of the tax liabilities. These differences will be reflected as increases or decreases to income tax expense in the period in which they are determined. While the Company believes the resulting tax balances as of December 31, 2018 and 2017 were appropriately accounted for in accordance with FASB ASC 740, the ultimate outcome of such matters could result in favorable or unfavorable adjustments to the consolidated financial statements and such adjustments could be material.

In 2017, in connection with its initial analysis of the TCJA, the Company recorded a provisional estimated net income tax expense of $2.4 million by applying the guidance under Staff Accounting Bulletin No. 118, Income Tax Accounting Implications of the Tax Cuts and Jobs Act ("SAB 118"). In accordance with SAB 118, the estimated income tax represented the Company’s best estimate at the time it was made, but also understanding that the provisional amount was subject to further adjustments under SAB 118. During 2018, the Company finalized its calculations of the transition tax liability under the TCJA and adjusted the liability downward by $1.9 million primarily due to further refinement of computations related to earnings and

profits, cash and cash equivalents, state income tax and foreign withholding taxes pursuant to guidance issued during the year. This adjustment was recorded as a reduction to income tax expense in 2018.
Refer to Note 11 for additional information regarding taxes on income and the impact of the TCJA.

Earnings per Share

Earnings per share have been calculated using the following share information:

	Years Ended December 31,		
	2018	2017	2016
Weighted average number of common shares used for basic EPS	32,345,382	33,150,949	34,713,937
Effect of dilutive stock options and restricted and deferred stock unit awards	652,621	—	496,493
Weighted average number of common shares and dilutive potential common stock used in dilutive EPS	32,998,003	33,150,949	35,210,430

The Company excluded 735,577 stock options and restricted and deferred stock units in 2017 from the diluted earnings per share calculation for the Company's common stock because of the reported net loss for the period. The Company excluded 4,049, 73,897 and 77,807 stock options in 2018, 2017 and 2016, respectively, from the diluted earnings per share calculations for the Company's common stock because they were anti-dilutive as their exercise prices were greater than the average market price of common shares for each period.

Purchase Price Accounting

The Company accounts for its acquisitions in accordance with FASB ASC 805, Business Combinations. The base cash purchase price plus the estimated fair value of any non-cash or contingent consideration given for an acquired business is allocated to the assets acquired (including identified intangible assets) and liabilities assumed based on the estimated fair values of such assets and liabilities. The excess of the total consideration over the aggregate net fair values assigned is recorded as goodwill. Contingent consideration, if any, is recognized as a liability as of the acquisition date with subsequent adjustments recorded in the consolidated statements of operations. Indirect and general expenses related to business combinations are expensed as incurred.

The Company typically determines the fair value of tangible and intangible assets acquired in a business combination using independent valuations that rely on management's estimates of inputs and assumptions that a market participant would use. Key assumptions include cash flow projections, growth rates, asset lives, and discount rates based on an analysis of weighted average cost of capital.

Classification of Current Assets and Current Liabilities

The Company includes in current assets and current liabilities certain amounts realizable and payable under construction contracts that may extend beyond one year. The construction periods on projects undertaken by the Company generally range from less than one month to 24 months.

At December 31, 2018, the Company's balance in contract liabilities was $32.3 million, which decreased $19.3 million from $51.6 million at December 31, 2017 primarily due to the timing of billing and advance deposits received on certain projects in the Company's coating services operation in the Middle East.

Cash, Cash Equivalents and Restricted Cash

The Company classifies highly liquid investments with original maturities of 90 days or less as cash equivalents. Recorded book values are reasonable estimates of fair value for cash and cash equivalents.

Cash, cash equivalents and restricted cash reported within the Consolidated Balance Sheets and Consolidated Statements of Cash Flows are as follows (in thousands):

Balance sheet data	December 31, 2018	December 31, 2017[(1)]
Cash and cash equivalents	$ 83,527	$ 105,717
Restricted cash	1,359	1,839
Cash, cash equivalents and restricted cash	$ 84,886	$ 107,556

(1) Amounts exclude $1.0 million of cash and cash equivalents classified as held for sale at December 31, 2017 (see Note 6).

76

Restricted cash held in escrow primarily relates to funds reserved for legal requirements, deposits made in lieu of retention on specific projects performed for municipalities and state agencies, or advance customer payments and compensating balances for bank undertakings in Europe. Restricted cash related to operations is similar to retainage, and is, therefore, classified as a current asset, consistent with the Company's policy on retainage.

Inventories

Inventories are stated at the lower of cost (first-in, first-out) or market. Actual cost is used to value raw materials and supplies. Standard cost, which approximates actual cost, is used to value work-in-process, finished goods and construction materials. Standard cost includes direct labor, raw materials and manufacturing overhead based on normal capacity. For certain businesses within our Corrosion Protection segment, the Company uses actual costs or average costs for all classes of inventory.

Retainage

Many of the contracts under which the Company performs work contain retainage provisions. Retainage refers to that portion of revenue earned by the Company but held for payment by the customer pending satisfactory completion of the project. The Company generally invoices its customers periodically as work is completed. Under ordinary circumstances, collection from municipalities is made within 60 to 90 days of billing. In most cases, 5% to 15% of the contract value is withheld by the municipal owner pending satisfactory completion of the project. Collections from other customers are generally made within 30 to 45 days of billing. Unless reserved, the Company believes that all amounts retained by customers under such provisions are fully collectible. Retainage on active contracts is classified as a current asset regardless of the term of the contract. Retainage is generally collected within one year of the completion of a contract, although collection can extend beyond one year from time to time. As of December 31, 2018, retainage receivables aged greater than 365 days approximated 10% of the total retainage balance and collectibility was assessed as described in the allowance for doubtful accounts section below.

Allowance for Doubtful Accounts

Management makes estimates of the uncollectibility of accounts receivable and retainage. The Company records an allowance based on specific accounts to reduce receivables, including retainage, to the amount that is expected to be collected. The specific allowances are reevaluated and adjusted as additional information is received. After all reasonable attempts to collect the receivable or retainage have been explored, the account is written off against the allowance. The Company also includes reserves related to certain accounts receivable that may be in litigation or dispute.

Long-Lived Assets

Property, plant and equipment and other identified intangibles (primarily customer relationships, patents and acquired technologies, trademarks, licenses and non-compete agreements) are recorded at cost, net of accumulated depreciation, amortization and impairment, and, except for goodwill, are depreciated or amortized on a straight-line basis over their estimated useful lives. Changes in circumstances such as technological advances, changes to the Company's business model or changes in the Company's capital strategy can result in the actual useful lives differing from the Company's estimates. If the Company determines that the useful life of its property, plant and equipment or its identified intangible assets should be shortened, the Company would depreciate or amortize the net book value in excess of the salvage value over its revised remaining useful life, thereby increasing depreciation or amortization expense.

Long-lived assets, including property, plant and equipment and other intangibles, are reviewed for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Such impairment tests are based on a comparison of undiscounted cash flows to the recorded value of the asset. The estimate of cash flow is based upon, among other things, assumptions about expected future operating performance. The Company's estimates of undiscounted cash flow may differ from actual cash flow due to, among other things, technological changes, economic conditions, changes to its business model or changes in its operating performance. If the sum of the undiscounted cash flows is less than the carrying value, the Company recognizes an impairment loss, measured as the amount by which the carrying value exceeds the fair value of the asset.

Impairment Review – 2017

As part of the 2017 Restructuring, which was approved by the Company’s board of directors on July 28, 2017, the Company exited all non-pipe related contract applications for the Tyfo® system in North America. As a result of this action, the Company evaluated the long-lived assets of its Fyfe reporting unit, which caused the Company to review the financial performance of at-risk asset groups within the Fyfe reporting unit in accordance with FASB ASC 360, Property, Plant and Equipment (“FASB ASC 360”). The results of the Fyfe reporting unit and its related asset groups are reported within the Infrastructure Solutions reportable segment.

The assets of an asset group represent the lowest level for which identifiable cash flows can be determined independent of other groups of assets and liabilities. The Fyfe North America asset group was the only at-risk asset group reviewed for impairment. The Company developed internal forward business plans under the guidance of local and regional leadership to determine the undiscounted expected future cash flows derived from Fyfe North America's long-lived assets. Such were based on management's best estimates considering the likelihood of various outcomes. Based on the internal projections, the Company determined that the sum of the undiscounted expected future cash flows for the Fyfe North America asset group was less than the carrying value of the assets, and as a result, engaged a third-party valuation firm to assist management in determining the fair value of long-lived assets for the Fyfe North America asset group.

In order to determine the impairment amount of long-lived assets, the Company first determined the fair value of each key component of its long-lived assets for the Fyfe North America asset group. The fair values were derived using various income-based approaches, which utilize discounted cash flows to evaluate the net earnings attributable to the asset being measured. Key assumptions used in assessment include the discount rate (based on weighted-average cost of capital), revenue growth rates, contributory asset charges, customer attrition, income tax rates and working capital needs, which were based on current market conditions and were consistent with internal management projections. Based on the results of the valuation, the carrying amount of certain long-lived assets for the Fyfe North America asset group exceeded the fair value. Accordingly, the Company recorded impairment charges of $3.4 million to trademarks, $20.8 million to customer relationships and $16.8 million to patents and acquired technology in 2017. The impairment charges were recorded to "Definite-lived intangible asset impairment" in the Consolidated Statement of Operations. Property, plant and equipment were determined to have a carrying value that exceeded fair value; thus, no impairment was recorded.

The fair value estimates described above were determined using observable inputs and significant unobservable inputs, which are based on level 3 inputs as defined in Note 13.

Goodwill

Under FASB ASC 350, the Company assesses recoverability of goodwill on an annual basis or when events or changes in circumstances indicate that the carrying amount of goodwill may not be recoverable. An impairment charge will be recognized to the extent that the fair value of a reporting unit is less than its carrying value. Factors that could potentially trigger an impairment review include (but are not limited to):

- significant underperformance of a segment relative to expected, historical or forecasted operating results;
- significant negative industry or economic trends;
- significant changes in the strategy for a segment including extended slowdowns in the segment's market;
- a decrease in market capitalization below the Company's book value; and
- a significant change in regulations.

Whether during the annual impairment assessment or during a trigger-based impairment review, the Company determines the fair value of its reporting units and compares such fair value to the carrying value of those reporting units to determine if there are any indications of goodwill impairment.

Fair value of reporting units is determined using a combination of two valuation methods: a market approach and an income approach with each method given equal weight in determining the fair value assigned to each reporting unit. Absent an indication of fair value from a potential buyer or similar specific transaction, the Company believes the use of these two methods provides a reasonable estimate of a reporting unit's fair value. Assumptions common to both methods are operating plans and economic outlooks, which are used to forecast future revenues, earnings and after-tax cash flows for each reporting unit. These assumptions are applied consistently for both methods.

The market approach estimates fair value by first determining earnings before interest, taxes, depreciation and amortization ("EBITDA") multiples for comparable publicly-traded companies with similar characteristics of the reporting unit. The EBITDA multiples for comparable companies are based upon current enterprise value. The enterprise value is based upon current market capitalization and includes a control premium. The Company believes this approach is appropriate because it provides a fair value estimate using multiples from entities with operations and economic characteristics comparable to its reporting units.

The income approach is based on forecasted future (debt-free) cash flows that are discounted to present value using factors that consider timing and risk of future cash flows. The Company believes this approach is appropriate because it provides a fair value estimate based upon the reporting unit's expected long-term operating cash flow performance. Discounted cash flow projections are based on financial forecasts developed from operating plans and economic outlooks, growth rates, estimates of future expected changes in operating margins, terminal value growth rates, future capital expenditures and changes in working capital requirements. Estimates of discounted cash flows may differ from actual cash flows due to, among other things, changes in economic conditions, changes to business models, changes in the Company's weighted average cost of capital, or changes in operating performance.

The discount rate applied to the estimated future cash flows is one of the most significant assumptions utilized under the income approach. The Company determines the appropriate discount rate for each of its reporting units based on the weighted average cost of capital ("WACC") for each individual reporting unit. The WACC takes into account both the pre-tax cost of debt and cost of equity (including the risk-free rate on twenty year U.S. Treasury bonds), and certain other company-specific and market-based factors. As each reporting unit has a different risk profile based on the nature of its operations, the WACC for each reporting unit is adjusted, as appropriate, to account for company-specific risks. Accordingly, the WACC for each reporting unit may differ.

Annual Impairment Assessment – October 1, 2018

The Company had six reporting units for purposes of assessing goodwill at October 1, 2018 as follows: Municipal Pipe Rehabilitation, Fyfe, Corrpro, United Pipeline Systems, Coating Services and Energy Services. During 2018, the Company acquired Hebna and P2S (see Note 1) and integrated them into the United Pipeline Systems and Energy Services reporting units, respectively.

Significant assumptions used in the Company's October 2018 goodwill review included: (i) discount rates ranging from 13.0% to 16.0%; (ii) compound annual growth rates for revenues generally ranging from -3.2% to 4.8%; (iii) gross margin stability in the short term related to certain reporting units affected by the 2017 Restructuring, but slightly increased gross margins long term; (iv) peer group EBITDA multiples; and (v) terminal values for each reporting unit using a long-term growth rate of 1.0% to 3.0%.

The Company's assessment of each reporting unit's fair value in relation to its respective carrying value yielded one reporting unit with a fair value within 15 percent of its carrying value and no reporting units with a fair value below carrying value or within 10 percent of its carrying value. The reporting unit with a fair value within 15 percent of its carrying value was the Energy Services reporting unit, which had $48.0 million of goodwill recorded at the impairment testing date. The Energy Services reporting unit has several large customers and primarily operates in the California downstream oil and gas market, which has experienced significant market changes in recent years Projected cash flows were based on continued strength in the Central California downstream energy market and a continued, growing relationship with its primary customer base.

Impairment Review – 2017

As part of the 2017 Restructuring, which was approved by the Company's board of directors on July 28, 2017, the Company exited all non-pipe related contract applications for the Tyfo® system in North America. As a result of this action, the Company evaluated the goodwill of its Fyfe reporting unit and determined that a triggering event occurred. As such, the Company engaged a third-party valuation to assist management in performing a goodwill impairment review for its Fyfe reporting unit during the third quarter of 2017. In accordance with the provisions of FASB ASC 350, the Company determined the fair value of the reporting unit and compared such fair value to the carrying value of the reporting unit. For the Fyfe reporting unit, carrying value, as adjusted for the long-lived asset impairments discussed previously, exceeded fair value by approximately 45%.

Despite the Company's recent investments in sales resources to drive growth in North America, FRP technology has become more widely accepted and more contractors have become proficient with installation, which has begun to commoditize the application of the Tyfo® system during construction in the North American civil structure market. As a result of this and other factors, the Company decided to exit all non-pipe related contract applications for the Tyfo® system in North America. The Company is now focused on using its expertise in FRP technologies to promote third-party product sales, continuing pipe-related FRP installations and providing technical engineering support in the civil structural market in North America. The FRP operation in Asia remains largely unchanged as market conditions remain favorable.

The Company's decision, as noted above, lowered the expected future cash flows of the reporting unit. As a result, the values derived from both the income approach and the market approach decreased from the October 1, 2016 annual goodwill impairment analysis. The fair value for the Fyfe reporting unit decreased $105.2 million, or 65.3%, from the previous analysis. The impairment analysis assumed a weighted average cost of capital of 17.0%, which is higher than the 16.0% utilized in the October 1, 2016 review, primarily due to rising risk-free rates on twenty-year U.S. Treasury bonds. The company-specific factors influencing discount rates remained consistent in both analyses. The impairment analysis also assumed a long-term growth rate of 2.5%, which was reduced from 3.5% used in the October 1, 2016 review. This change reflects the Company's expectations for future annual revenue growth, which were lowered from 10.8% in the previous analysis to 4.0%, primarily due to the downsizing of the North American operations. Expected gross margins were consistent between both analyses.

As of January 1, 2017, the Company adopted FASB Accounting Standards Update No. 2017-04, Simplifying the Test for Goodwill Impairment, which states that an impairment charge should be recognized for the amount by which the carrying amount exceeds the reporting unit's fair value. Based on the impairment analysis, the Company determined that recorded goodwill at the Fyfe reporting unit was impaired by $45.4 million, which was recorded to "Goodwill impairment" in the Consolidated Statement of Operations during the third quarter of 2017. As of December 31, 2017, the Company had remaining Fyfe goodwill of $9.6 million. Projected cash flows were based, in part, on the ability to grow third-party product sales and pressure pipe contracting in North America, and maintaining a presence in other international markets. If these assumptions do not materialize in a manner consistent with Company's expectations, there is risk of additional impairment to recorded goodwill.

Investments in Variable Interest Entities

The Company evaluates all transactions and relationships with variable interest entities ("VIE") to determine whether the Company is the primary beneficiary of the entities in accordance with FASB ASC 810, Consolidation.

The Company's overall methodology for evaluating transactions and relationships under the VIE requirements includes the following two steps:

- determine whether the entity meets the criteria to qualify as a VIE; and
- determine whether the Company is the primary beneficiary of the VIE.

In performing the first step, the significant factors and judgments that the Company considers in making the determination as to whether an entity is a VIE include:

- the design of the entity, including the nature of its risks and the purpose for which the entity was created, to determine the variability that the entity was designed to create and distribute to its interest holders;
- the nature of the Company's involvement with the entity;
- whether control of the entity may be achieved through arrangements that do not involve voting equity;
- whether there is sufficient equity investment at risk to finance the activities of the entity; and
- whether parties other than the equity holders have the obligation to absorb expected losses or the right to receive residual returns.

If the Company identifies a VIE based on the above considerations, it then performs the second step and evaluates whether it is the primary beneficiary of the VIE by considering the following significant factors and judgments:

- whether the entity has the power to direct the activities of a variable interest entity that most significantly impact the entity's economic performance; and
- whether the entity has the obligation to absorb losses of the entity that could potentially be significant to the variable interest entity or the right to receive benefits from the entity that could potentially be significant to the variable interest entity.

Based on its evaluation of the above factors and judgments, as of December 31, 2018, the Company consolidated any VIEs in which it was the primary beneficiary.

Financial data for consolidated variable interest entities are summarized in the following tables (in thousands):

	December 31,	
Balance sheet data	2018	2017 (1)
Current assets	$33,066	$42,732
Non-current assets	6,466	26,346
Current liabilities	12,953	12,449
Non-current liabilities	8,780	30,675

(1) Amounts include $25.4 million of assets and $9.8 million of liabilities classified as held for sale relating to our pipe coating and insulation joint venture in Louisiana, Bayou Wasco Insulation, LLC. See Note 6.

	Years Ended December 31,		
Statement of operations data	2018	2017 (1)	2016
Revenue	$49,809	$91,947	$61,205
Gross profit	9,898	15,194	5,760
Net income (loss)	(1,374)	3,432	(3,075)

(1) During 2017, increases were primarily driven from: (i) our joint venture in Louisiana, which completed its work on a large deepwater pipe coating and insulation project; and (ii) the formation of our new joint venture in South Africa.

Accounting Standards Updates

In August 2018, the FASB issued Accounting Standards Update No. 2018-13, Fair Value Measurement: Disclosure Framework—Changes to the Disclosure Requirements for Fair Value Measurement, which modifies the disclosure requirements for Level 1, Level 2 and Level 3 instruments in the fair value hierarchy. The guidance is effective for the Company's fiscal year beginning January 1, 2020, including interim periods within that fiscal year. The adoption of this standard is not expected to have a material impact on its consolidated financial statements.

In February 2018, the FASB issued Accounting Standards Update No. 2018-02, Reclassification of Certain Tax Effects from Accumulated Other Comprehensive Income, which permits a company to reclassify the income tax effects of the TCJA on items within accumulated other comprehensive income to retained earnings. The guidance is effective for the Company's fiscal year beginning January 1, 2019, including interim periods within that fiscal year. Companies may adopt the new guidance using one of two transition methods: (i) retrospective to each period (or periods) in which the income tax effects are recognized, or (ii) at the beginning of the period of adoption. The Company adopted this standard effective January 1, 2019 and elected not to reclassify the tax effects due to the immaterial impact on the Company's consolidated financial statements.

In August 2017, the FASB issued Accounting Standards Update No. 2017-12, Derivatives and Hedging (Topic 815): Targeted Improvements to Accounting for Hedging Activities, which amends the recognition and presentation requirements for hedge accounting activities. The standard improves the financial reporting of hedging relationships to better portray the economic results of an entity's risk management activities in its financial statements and reduces the complexity of applying hedge accounting. This new guidance is effective for the Company's fiscal year beginning January 1, 2019, but the Company early-adopted this standard, effective January 1, 2018. The adoption of this standard did not have a material impact on the Company's consolidated financial statements.

In November 2016, the FASB issued Accounting Standards Update No. 2016-18, Statement of Cash Flows (Topic 230): Restricted Cash, which requires that a statement of cash flows explain the change during the period in the total of cash, cash equivalents, and restricted cash. As a result, restricted cash is included with cash and cash equivalents when reconciling the beginning-of-period and end-of-period total amounts shown on the statement of cash flows. This new guidance was effective for the Company's fiscal year beginning January 1, 2018 and applied retrospectively. The Company's adoption of this standard, effective January 1, 2018, did not have a material impact on its consolidated financial statements, other than the classification of restricted cash on the Consolidated Statement of Cash Flows.

In August 2016, the FASB issued Accounting Standards Update No. 2016-15, Statement of Cash Flows (Topic 230): Classification of Certain Cash Receipts and Cash Payments, which addresses diversity in how certain cash receipts and cash payments are presented and classified in the statement of cash flows. The standard was effective for the Company's fiscal year beginning January 1, 2018, the adoption of which did not have a material impact on its consolidated financial statements.

In February 2016, the FASB issued Accounting Standards Update No. 2016-02, Leases (Topic 842), that requires lessees to present right-of-use assets and lease liabilities on the balance sheet for all leases with lease terms longer than twelve months. The standard is effective for the Company's fiscal year beginning January 1, 2019, including interim periods within that fiscal year. The Company will adopt the new guidance using the cumulative effect method, which would apply to all new lease contracts initiated on or after January 1, 2019. The Company will also elect the package of practical expedients not to reassess prior conclusions related to contracts containing leases, lease classification and initial direct costs and the lessee practical expedient to combine lease and non-lease components. The Company also made a policy election to not recognize right-of-use assets and lease liabilities for short-term leases for all asset classes.

Based on the Company's current lease portfolio, adoption of the standard will result in a right-of-use asset and related lease liability in a range from $60 million to $70 million in the consolidated balance sheets. The impact to the Company's consolidated statements of income and consolidated statements of cash flows is not expected to be material. The Company is also implementing enhanced internal controls and a third-party software solution to support recognition and disclosure under the new standard.

In May 2014, the FASB issued Accounting Standards Update No. 2014-09, Revenue from Contracts with Customers (Topic 606), which replaces revenue recognition requirements regarding contracts with customers to transfer goods or services with a single revenue recognition model for recognizing revenue. Under the new guidance, entities are required to recognize revenue to depict the transfer of promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. The guidance provides a five-step analysis to be performed on transactions to determine when and how revenue is recognized. The Company adopted this standard, effective January 1, 2018, using the modified retrospective transition method. See Note 3.

3. REVENUES

On January 1, 2018, the Company adopted FASB ASC 606, Revenue from Contracts with Customers ("FASB ASC 606") for all contracts that were not completed using the modified retrospective transition method. The Company recognized the cumulative effect of initially applying FASB ASC 606 as an adjustment to the opening balance of retained earnings. Prior period information has not been restated and continues to be reported under the accounting standards in effect for those periods.

The Company recorded a net reduction to opening retained earnings of $0.3 million as of January 1, 2018 due to the cumulative impact of adopting FASB ASC 606, with the impact primarily related to royalty license fee revenues. The impact to revenues for the year ended December 31, 2018 was an increase of $1.8 million as a result of applying FASB ASC 606.

Performance Obligations

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer, and is the unit of account in FASB ASC 606. A contract's transaction price is allocated to each distinct performance obligation and recognized as revenue when, or as, the performance obligation is satisfied. For contracts in which construction, engineering and installation services are provided, there is generally a single performance obligation as the promise to transfer the individual goods or services is not separately identifiable from other promises in the contracts and, therefore, not distinct. The bundle of goods and services represents the combined output for which the customer has contracted. For product sales contracts with multiple performance obligations where each product is distinct, the Company allocates the contract's transaction price to each performance obligation using its best estimate of the standalone selling price of each distinct good in the contract. For royalty license agreements whereby intellectual property is transferred to the customer, there is a single performance obligation as the license is not separately identifiable from the other goods and services in the contract.

The Company's performance obligations are satisfied over time as work progresses or at a point in time. Revenues from products and services transferred to customers over time accounted for 93.5%, 93.5% and 92.2% of revenues for the years ended December 31, 2018, 2017 and 2016, respectively. Revenues from construction, engineering and installation services are recognized over time using an input measure (e.g., costs incurred to date relative to total estimated costs at completion) to measure progress toward satisfying performance obligations. Incurred cost represents work performed, which corresponds with, and thereby best depicts, the transfer of control to the customer. Contract costs include labor, material, overhead and, when appropriate, general and administrative expenses. Revenues from maintenance contracts are structured such that the Company has the right to consideration from a customer in an amount that corresponds directly with the performance completed to date. Therefore, the Company utilizes the practical expedient in FASB ASC 606-55-255, which allows the Company to recognize revenue in the amount to which it has the right to invoice. Applying this practical expedient, the Company is not required to disclose the transaction price allocated to remaining performance obligations under these agreements. Revenues from royalty license arrangements are recognized either at contract inception when the license is transferred or when the royalty has been earned, depending on whether the contract contains fixed consideration. Revenues from stand-alone product sales are recognized at a point in time, when control of the product is transferred to the customer. Revenues from these types of contracts accounted for 6.5%, 6.5% and 7.8% of revenues for the years ended December 31, 2018, 2017 and 2016, respectively.

On December 31, 2018, the Company had $488.8 million of remaining performance obligations from construction, engineering and installation services. The Company estimates that approximately $433.3 million, or 88.6%, of the remaining performance obligations at December 31, 2018 will be realized as revenues in the next 12 months.

Contract Estimates

Accounting for long-term contracts involves the use of various techniques to estimate total contract revenue and costs. For long-term contracts, the Company estimates the profit on a contract as the difference between the total estimated revenue and expected costs to complete a contract, and recognizes that profit over the life of the contract. Contract estimates are based on various assumptions to project the outcome of future events that sometimes span multiple years. These assumptions include labor productivity and availability; the complexity of the work to be performed; the cost and availability of materials; the performance of subcontractors; and the availability and timing of funding from the customer.

The Company’s contracts do not typically contain variable consideration or other provisions that increase or decrease the transaction price. In rare situations where the transaction price is not fixed, the Company estimates variable consideration at the most likely amount to which it expects to be entitled. The Company includes estimated amounts 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. For royalty license agreements, the Company applies the sales-based and usage-based royalty exception and recognizes royalties at the later of: (i) when the subsequent sale or usage occurs; or (ii) the satisfaction or partial satisfaction of the performance obligation to which some or all of the sales-or usage-based royalty has been allocated. For contracts in which a portion of the transaction price is retained and paid after the good or service has been transferred to the customer, the Company does not recognize a significant financing component. The primary purpose of the retainage payment is often to provide the customer with assurance that the Company will perform its obligations under the contract, rather than to provide financing to the customer.

The Company's estimates of variable consideration and determination of whether to include estimated amounts in the transaction price are based largely on an assessment of anticipated performance and all information (historical, current and forecasted) that is reasonably available.

Revenue by Category

The following tables summarize revenues by segment and geography (in thousands):

	Year Ended December 31, 2018			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Primary geographic region:				
United States	$430,187	$200,397	$335,707	$966,291
Canada	62,292	71,320	—	133,612
Europe	54,567	12,227	—	66,794
Other foreign	57,075	109,796	—	166,871
Total revenues	$604,121	$393,740	$335,707	$1,333,568

	Year Ended December 31, 2017			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Primary geographic region:				
United States	$437,944	$299,643	$290,726	$1,028,313
Canada	60,675	79,059	—	139,734
Europe	58,520	13,319	—	71,839
Other foreign	55,015	64,118	—	119,133
Total revenues	$612,154	$456,139	$290,726	$1,359,019

	Year Ended December 31, 2016			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Primary geographic region:				
United States	$425,990	$249,690	$248,900	$924,580
Canada	47,587	81,704	—	129,291
Europe	45,046	15,192	—	60,238
Other foreign	52,928	54,883	—	107,811
Total revenues	$571,551	$401,469	$248,900	$1,221,920

The following tables summarize revenues by segment and contract type (in thousands):

	Year Ended December 31, 2018			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Contract type:				
Fixed fee	$556,642	$296,217	$16,134	$868,993
Time and materials	—	58,372	319,573	377,945
Product sales	45,030	39,151	—	84,181
License fees	2,449	—	—	2,449
Total revenues	$604,121	$393,740	$335,707	$1,333,568

83

	Year Ended December 31, 2017			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Contract type:				
Fixed fee	$569,701	$353,480	$9,225	$932,406
Time and materials	—	56,288	281,501	337,789
Product sales	41,878	46,371	—	88,249
License fees	575	—	—	575
Total revenues	$612,154	$456,139	$290,726	$1,359,019

	Year Ended December 31, 2016			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Contract type:				
Fixed fee	$524,311	$301,114	$14,838	$840,263
Time and materials	—	52,240	234,062	286,302
Product sales	47,232	48,115	—	95,347
License fees	8	—	—	8
Total revenues	$571,551	$401,469	$248,900	$1,221,920

Contract Balances

The timing of revenue recognition, billings and cash collections results in billed accounts receivable, contract assets and contract liabilities on the Consolidated Balance Sheets. Contract assets represent work performed that could not be billed either due to contract stipulations or the required contractual documentation has not been finalized. Substantially all unbilled amounts are expected to be billed and collected within one year.

For fixed fee and time-and-materials based contracts, amounts are billed as work progresses in accordance with agreed-upon contractual terms, either at periodic intervals or upon achievement of contractual milestones. Generally, billing occurs subsequent to revenue recognition, resulting in contract assets. For some royalty license arrangements, minimum amounts are billed over the license term as quarterly royalty amounts are determined. This results in contract assets as the Company recognizes revenue for the license when the license is transferred to the customer at contract inception. The Company’s contract liabilities consist of advance payments, billings in excess of revenue recognized and deferred revenue.

The Company’s contract assets and contract liabilities are reported in a net position on a contract-by-contract basis at the end of each reporting period. Advance payments, billings in excess of revenue recognized and deferred revenue are each classified as current.

Net contract assets (liabilities) consisted of the following (in thousands):

	December 31, 2018[(1)]	December 31, 2017[(2)]
Contract assets – current	$62,467	$75,371
Contract liabilities – current[(3)]	(32,339)	(51,597)
Net contract assets	$30,128	$23,774

(1) Amounts exclude contract assets of $1.8 million and contract liabilities of less than $0.1 million that were classified as held for sale at December 31, 2018 (see Note 6).

(2) Amounts exclude contract assets of $1.3 million and contract liabilities of $5.5 million that were classified as held for sale at December 31, 2017 (see Note 6).

(3) Decrease primarily due to the timing of billing and advance deposits received on certain projects in the Company’s coating services operation in the Middle East.

Included in the change of total net contract assets was a $12.9 million decrease in contract assets, primarily related to the timing between work performed on open contracts and contractual billing terms, and a $19.3 million decrease in contract liabilities, primarily related to the timing of customer advances on certain contracts.
Substantially all of the $51.6 million and $62.7 million contract liabilities balances at December 31, 2017 and December 31, 2016, respectively, were recognized in revenues during 2018 and 2017, respectively.
Impairment losses recognized on receivables and contract assets were not material during 2018, 2017 and 2016.

4. RESTRUCTURING

2017 Restructuring

On July 28, 2017, the Company's board of directors approved the 2017 Restructuring. As part of the 2017 Restructuring, the Company announced plans to: (i) divest Bayou; (ii) exit all non-pipe related contract applications for the Tyfo® system in North America; (iii) right-size the cathodic protection services operation in Canada and the CIPP businesses in Australia and Denmark; and (iv) reduce corporate and other operating costs.
During 2018, the Company's board of directors approved additional actions with respect to the 2017 Restructuring, which included the decisions to: (i) divest the Australia and Denmark CIPP businesses; (ii) take actions to further optimize operations within North America, including measures to reduce consolidated operating costs; and (iii) divest or otherwise exit multiple additional international businesses, including: (a) the Company's cathodic protection installation activities in the Middle East, including Corrpower International Limited, the Company's cathodic protection materials manufacturing and production joint venture in Saudi Arabia; (b) United Pipeline de Mexico S.A. de C.V., the Company's Tite Liner® joint venture in Mexico; (c) the Company's Tite Liner® businesses in Brazil and Argentina; (d) Aegion South Africa Proprietary Limited, the Company's Tite Liner® and CIPP joint venture in the Republic of South Africa; and (e) the Company's CIPP contract installation operations in England.
Total pre-tax 2017 Restructuring and related impairment charges since inception were $139.7 million ($125.9 million post-tax) and consisted of cash charges totaling $25.8 million and non-cash charges totaling $113.9 million. Cash charges included employee severance, retention, extension of benefits, employment assistance programs and other restructuring costs associated with the restructuring efforts described above. Non-cash charges included (i) $86.4 million related to goodwill and long-lived asset impairment charges recorded in 2017 as part of exiting the non-pipe FRP contracting market in North America, and (ii) $27.5 million related to allowances for accounts receivable, write-offs of inventory and long-lived assets, impairment of definite-lived intangible assets, as well as net losses on the disposal of both domestic and international entities. The Company reduced headcount by approximately 360 employees as a result of these actions.
The Company expects to incur additional cash and non-cash charges of $15 million to $19 million during 2019. The identified charges are primarily focused in the international operations of both Infrastructure Solutions and Corrosion Protection, but will also include certain charges in Energy Services to a lesser extent. The Company expects to reduce headcount by an additional 100 employees as a result of these further actions.
During 2018 and 2017, the Company recorded pre-tax expenses related to the 2017 Restructuring as follows (in thousands):

	Year Ended December 31, 2018			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Severance and benefit related costs	$3,124	$ 1,178	$ 234	$4,536
Lease and contract termination costs	1,999	175	—	2,174
Relocation and other moving costs	184	—	—	184
Other restructuring costs (1)	14,036	8,400	156	22,592
Total pre-tax restructuring charges (2)	$19,343	$ 9,753	$ 390	$29,486

(1) Includes charges primarily related to certain wind-down costs, allowances for accounts receivable, fixed asset disposals and other restructuring-related costs in connection with exiting non-pipe-related contract applications for the Tyfo® system in North America, divesting the CIPP operations in Australia and Denmark, and exiting the

cathodic protection operations in the Middle East. Amounts also include goodwill and definite-lived intangible asset impairments related to Denmark and definite-lived intangible asset impairments related to the cathodic protection operations in the Middle East.

(2) Includes $1.6 million of corporate-related restructuring charges that have been allocated to the reportable segments.

	Year Ended December 31, 2017		
	Infrastructure Solutions	Corrosion Protection	Total
Severance and benefit related costs	$4,587	$ 2,758	$7,345
Lease and contract termination costs	4,545	775	5,320
Relocation and other moving costs	26	121	147
Other restructuring costs [1]	8,668	2,263	10,931
Total pre-tax restructuring charges [2]	$17,826	$ 5,917	$23,743

(1) Includes charges primarily related to exiting non-pipe-related applications for the Tyfo® system in North America and right-sizing the cathodic protection services operation in Canada, inclusive of wind-down costs, professional fees, patent write offs, fixed asset disposals and certain other restructuring and related charges.

(2) Includes $1.3 million of corporate-related restructuring charges that have been allocated to the Infrastructure Solutions and Corrosion Protection reportable segments.

2017 Restructuring costs related to severance, other termination benefit costs and early lease and contract termination costs were $6.9 million and $12.8 million in 2018 and 2017, respectively, and are reported on a separate line in the Consolidated Statements of Operations.

The following tables summarize charges related to the 2017 Restructuring recognized in 2018 and 2017 as presented in their affected line in the Consolidated Statements of Operations (in thousands):

	Year Ended December 31, 2018			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total [1]
Cost of revenues	$1,282	$ 599	$ —	$1,881
Operating expenses	7,976	5,187	156	13,319
Goodwill impairment	1,389	—	—	1,389
Definite-lived intangible asset impairment	910	1,124	—	2,034
Restructuring and related charges	5,306	1,354	234	6,894
Other expense [2]	2,480	1,489	—	3,969
Total pre-tax restructuring charges	$19,343	$ 9,753	$ 390	$29,486

(1) Total pre-tax restructuring charges include cash charges of $12.1 million and non-cash charges of $17.4 million. Cash charges consist of charges incurred during the year that will be settled in cash, either during the current period or future periods.

(2) Includes charges related to the loss on disposal of restructured entities, including the release of cumulative currency translation adjustments resulting from those disposals.

	Year Ended December 31, 2017		
	Infrastructure Solutions	Corrosion Protection	Total [1]
Cost of revenues	$30	$ 15	$45
Operating expenses	8,636	2,248	10,884
Restructuring and related charges	9,160	3,654	12,814
Total pre-tax restructuring charges	$17,826	$ 5,917	$23,743

(1) Total pre-tax restructuring charges include cash charges of $13.6 million and non-cash charges of $10.1 million. Cash charges consist of charges incurred during the year that will be settled in cash, either during the current period or future periods.

86

The following tables summarize the 2017 Restructuring activity during 2018 and 2017 (in thousands):

	Reserves at December 31, 2017	2018 Charge to Income	Foreign Currency Translation	Utilized in 2018		Reserves at December 31, 2018
				Cash[1]	Non-Cash	
Severance and benefit related costs	$ 3,864	$4,536	$ (69)	$6,589	$ —	$ 1,742
Lease and contract termination costs	650	2,174	(19)	2,446	—	359
Relocation and other moving costs	—	184	—	184	—	—
Other restructuring costs	675	22,592	(3)	5,581	17,372	311
Total pre-tax restructuring charges	$ 5,189	$29,486	$ (91)	$14,800	$ 17,372	$ 2,412

(1) Refers to cash utilized to settle charges during 2018.

	2017 Charge to Income	Utilized in 2017		Reserves at December 31, 2017
		Cash[1]	Non-Cash	
Severance and benefit related costs	$7,345	$3,481	$ —	$ 3,864
Lease and contract termination costs	5,320	2,706	1,964	650
Relocation and other moving costs	147	147	—	—
Other restructuring costs	10,931	2,140	8,116	675
Total pre-tax restructuring charges	$23,743	$8,474	$ 10,080	$ 5,189

(1) Refers to cash utilized to settle charges during 2017.

2016 Restructuring

On January 4, 2016, the Company's board of directors approved the 2016 Restructuring to reduce its exposure to the upstream oil markets and to reduce consolidated expenses. During 2016, the Company completed its restructuring, which included repositioning Energy Services' upstream operations in California, reducing Corrosion Protection's upstream exposure by divesting its interest in a Canadian pipe coating joint venture, right-sizing Corrosion Protection to compete more effectively and reducing corporate and other operating costs. The 2016 Restructuring reduced consolidated annual expenses by approximately $17.4 million, of which approximately $1.2 million, $6.6 million and $5.6 million related to recognized savings within Infrastructure Solutions, Corrosion Protection and Energy Services, respectively, and $4.0 million related to reduced corporate costs. Cost savings were achieved primarily through office closures and reducing headcount by 964 employees, or 15.5% of the Company's total workforce as of December 31, 2015.

The Company recorded total pre-tax charges, most of which were cash charges, of $16.1 million ($10.3 million post-tax) in connection with the 2016 Restructuring. These charges included employee severance, retention, extension of benefits, early lease termination and other restructuring costs associated with the restructuring efforts described above.

During 2016, the Company recorded pre-tax expense related to the 2016 Restructuring as follows (in thousands):

	Year Ended December 31, 2016			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Severance and benefit related costs	$2,249	$ 3,588	$ 1,559	$7,396
Lease termination costs	—	154	983	1,137
Relocation and other moving costs	307	62	193	562
Other restructuring costs (1)	808	761	5,436	7,005
Total pre-tax restructuring charges (2)	$3,364	$ 4,565	$ 8,171	$16,100

(1) For Energy Services, includes charges primarily related to downsizing the Company’s upstream operations in California, inclusive of wind-down costs, professional fees, fixed asset disposals and certain other restructuring charges.

(2) Includes $1.4 million of corporate-related restructuring charges that have been allocated to the Infrastructure Solutions, Corrosion Protection and Energy Services reportable segments.

2016 Restructuring costs related to severance, other termination benefit costs and early lease termination costs were $9.1 million in 2016 and reported on a separate line in the Consolidated Statements of Operations.
The following tables summarize all charges related to the 2016 Restructuring recognized in 2016 as presented in their affected line in the Consolidated Statements of Operations (in thousands):

	Year Ended December 31, 2016			
	Infrastructure Solutions	Corrosion Protection	Energy Services	Total [(1)]
Cost of revenues	$—	$ 278	$—	$278
Operating expenses	559	483	5,436	6,478
Restructuring and related charges	2,557	3,803	2,735	9,095
Other expense	249	—	—	249
Total pre-tax charges	$3,365	$ 4,564	$ 8,171	$16,100

(1) Total pre-tax restructuring charges include cash charges of $15.3 million and non-cash charges of $0.8 million for in 2016. Cash charges consist of charges incurred during the period that will be settled in cash, either during the current period or future periods.

The following tables summarize the 2016 Restructuring activity during 2017 and 2016 (in thousands):

	Reserves at December 31, 2016	2017 Charge to Income	Utilized in 2017		Reserves at December 31, 2017
			Cash [(1)]	Non-Cash	
Severance and benefit related costs	$ 645	$ —	$645	$ —	$ —
Lease termination costs	125	—	125	—	—
Relocation and other moving costs	10	—	10	—	—
Other restructuring costs	120	—	120	—	—
Total pre-tax restructuring charges	$ 900	$ —	$900	$ —	$ —

(1) Refers to cash utilized to settle charges during 2017.

	2016 Charge to Income	Utilized in 2016		Reserves at December 31, 2016
		Cash [(1)]	Non-Cash	
Severance and benefit related costs	$7,396	$6,751	$ —	$ 645
Lease termination costs	1,137	1,012	—	125
Relocation and other moving costs	562	552	—	10
Other restructuring costs	7,005	6,120	765	120
Total pre-tax restructuring charges	$16,100	$14,435	$ 765	$ 900

(1) Refers to cash utilized to settle charges during 2016.

5. SUPPLEMENTAL BALANCE SHEET INFORMATION

Allowance for Doubtful Accounts

Activity in the allowance for doubtful accounts is summarized as follows (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Balance, beginning of year	$5,775	$6,098	$14,524
Bad debt expense [1]	8,188	3,155	1,083
Write-offs and adjustments [2]	(4,268)	(3,478)	(9,509)
Balance, end of year	$9,695	$5,775	$6,098

---

(1) The Company recorded bad debt expense (reversals) of $5.3 million, $0.4 million and $(0.6) million in 2018, 2017 and 2016, respectively, as part of the restructuring efforts (see Note 4) and was primarily due to the exiting of certain low-return businesses mainly in foreign locations.

(2) 2016 includes the write-off of a $7.5 million reserve related to long-dated receivables, which were in litigation or dispute, within Infrastructure Solutions.

Inventories

Inventories are summarized as follows (in thousands):

	December 31,	
	2018 [1]	2017
Raw materials and supplies	$29,343	$30,265
Work-in-process	2,510	3,246
Finished products	15,205	13,596
Construction materials	9,379	16,862
Total	$56,437	$63,969

---

(1) During 2018, the Company incurred non-cash charges of $2.8 million related to estimates for inventory obsolescence within its cathodic protection operations. The charges were recorded to cost of revenues in the Consolidated Statement of Operations.

Property, Plant and Equipment

Property, plant and equipment consisted of the following (in thousands):

	Estimated Useful Lives (Years)	December 31, 2018	2017
Land and land improvements		$10,521	$10,258
Buildings and improvements	5 – 40	47,430	47,725
Machinery and equipment	4 – 10	147,918	159,626
Furniture and fixtures	3 – 10	37,471	35,149
Autos and trucks	3 – 10	51,129	54,039
Construction in progress		14,626	8,424
		309,095	315,221
Less – Accumulated depreciation		(202,036)	(206,181)
Property, plant & equipment, less accumulated depreciation		$107,059	$109,040

Depreciation expense was $23.9 million, $29.3 million and $30.4 million for the years ended December 31, 2018, 2017 and 2016, respectively. The decrease in 2018 was primarily due to the held for sale classification, and subsequent sale thereof, of Bayou’s assets and a partial year classification for Australia’s assets during 2018.

Accrued Expenses

Accrued expenses consisted of the following (in thousands):

	December 31, 2018	2017
Vendor and other accrued expenses	$35,450	$35,193
Estimated casualty and healthcare liabilities	17,419	14,772
Job costs	9,878	9,585
Accrued compensation	23,882	27,901
Income taxes payable	1,391	4,560
Total	$88,020	$92,011

6. ASSETS AND LIABILITIES HELD FOR SALE

On May 14, 2018, the Company's board of directors approved a plan to divest the assets and liabilities of Australia (see Note 1). The Company is currently in discussions with a third party and management believes that it is probable that a sale will occur in the first half of 2019.

On July 28, 2017, the Company's board of directors approved a plan to sell the assets and liabilities of Bayou. The Company completed a sale transaction during the third quarter of 2018. See Note 1.

The relevant asset and liability balances at December 31, 2018 and 2017 are accounted for as held for sale and measured at the lower of carrying value or fair value less cost to sell. No impairment charges were recorded on these assets as the net carrying value approximated or was less than management's current expectation of fair value less cost to sell. In the event the Company is unable to sell the assets and liabilities or sells them at a price or on terms that are less favorable, or at a higher cost than currently anticipated, the Company could incur impairment charges or a loss on disposal.

The following table provides the components of assets and liabilities held for sale (in thousands):

	December 31, 2018	2017
Assets held for sale:	Australia	Bayou
Current assets		
Cash and cash equivalents	$—	$989
Receivables, net	1,309	6,368
Retainage	15	—
Contract assets	1,777	1,299
Inventories	2,123	3,727
Prepaid expenses and other current assets	300	827
Total current assets	5,524	13,210
Property, plant & equipment, less accumulated depreciation	2,268	53,887
Identified intangible assets, less accumulated amortization	—	3,217
Total assets held for sale	$7,792	$70,314
Liabilities held for sale:		
Current liabilities		
Accounts payable	$1,331	$5,763
Accrued expenses	3,891	1,805
Contract liabilities	38	5,478
Total current liabilities	5,260	13,046
Long-term debt	—	7,757
Other non-current liabilities	—	97
Total liabilities held for sale	$5,260	$20,900

7. GOODWILL AND INTANGIBLE ASSETS

Goodwill

The following table presents a reconciliation of the beginning and ending balances of goodwill (in millions):

	Infrastructure Solutions	Corrosion Protection	Energy Services	Total
Balance, December 31, 2016				
Goodwill, gross	$ 239,494	$ 73,875	$ 80,246	$ 393,615
Accumulated impairment losses	(16,069)	(45,400)	(33,527)	(94,996)
Goodwill, net	223,425	28,475	46,719	298,619
2017 Activity:				
Acquisitions (1)	3,355	—	—	3,355
Impairments (2)	(45,390)	—	—	(45,390)
Foreign currency translation	3,637	494	—	4,131
Balance, December 31, 2017				
Goodwill, gross	246,486	74,369	80,246	401,101
Accumulated impairment losses	(61,459)	(45,400)	(33,527)	(140,386)
Goodwill, net	185,027	28,969	46,719	260,715
2018 Activity:				
Acquisitions (3)	—	2,715	1,258	3,973
Impairments (4)	(1,389)	—	—	(1,389)
Foreign currency translation	(1,965)	(701)	—	(2,666)
Balance, December 31, 2018				
Goodwill, gross	244,521	76,383	81,504	402,408
Accumulated impairment losses	(62,848)	(45,400)	(33,527)	(141,775)
Goodwill, net	$ 181,673	$ 30,983	$ 47,977	$ 260,633

(1) During 2017, the Company recorded goodwill of $3.4 million related to the acquisition of Environmental Techniques (see Note 1).

(2) During 2017, the Company recorded a $45.4 million goodwill impairment to its Fyfe reporting unit (see Note 2).

(3) During 2018, the Company recorded goodwill of $2.7 million and $1.3 million related to the acquisitions of Hebna and P2S, respectively (see Note 1).

(4) During 2018, the Company recorded a $1.4 million goodwill impairment related to restructuring activities in Denmark (see Note 4).

Intangible Assets

Intangible assets consisted of the following (in thousands):

	December 31, 2018				December 31, 2017		
	Weighted Average Useful Lives (Years)	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount	Gross Carrying Amount	Accumulated Amortization	Net Carrying Amount
License agreements [3]	1.6	$3,894	$(3,716)	$178	$4,497	$(3,623)	$874
Leases	2.0	864	(689)	175	796	(534)	262
Trademarks [2][3]	9.8	15,751	(6,202)	9,549	15,464	(6,184)	9,280
Non-competes [1][2]	4.3	2,529	(1,229)	1,300	1,197	(1,048)	149
Customer relationships [1][2][3]	8.9	159,719	(66,753)	92,966	160,423	(56,907)	103,516
Patents and acquired technology	5.6	38,338	(22,810)	15,528	39,285	(21,021)	18,264
		$221,095	$(101,399)	$119,696	$221,662	$(89,317)	$132,345

---

(1) During 2018, the Company recorded non-competes of $1.1 million and customer relationships of $1.3 million related to the acquisition of Hebna (see Note 1).

(2) During 2018, the Company recorded trademarks of $0.3 million, non-competes of $0.2 million and customer relationships of $0.7 million related to the acquisition of P2S (see Note 1).

(3) During 2018, the Company recorded intangible asset impairments related to restructuring activities in Denmark of $0.5 million for license agreements, $0.1 million for trademarks, and $0.3 million for customer relationships (see Note 4).

Amortization expense was $14.0 million, $16.1 million and $16.4 million for the years ended December 31, 2018, 2017 and 2016, respectively. Estimated amortization expense by year is as follows (in thousands):

Year	Amount
2019	$13,641
2020	13,603
2021	13,400
2022	13,400
2023	13,270

8. LONG-TERM DEBT AND CREDIT FACILITY

Long-term debt consisted of the following (in thousands):

	December 31,	
	2018	2017
Term note, due February 27, 2023, annualized rates of 4.59% and 3.60%, respectively	$282,188	$308,437
Line of credit, 4.45% and 3.50%, respectively	31,000	38,000
Other notes with interest rates from 3.3% to 7.8%	1,031	875
Subtotal	314,219	347,312
Less – Current maturities and notes payable	29,469	26,555
Less – Unamortized loan costs	2,747	2,517
Total	$282,003	$318,240

At December 31, 2018, principal payments required to be made for each of the next five years are summarized as follows (in thousands):

Year	Amount
2019	$29,469
2020	32,033
2021	25,060
2022	30,844
2023	196,813
Thereafter	—
Total	$314,219

Financing Arrangements

In October 2015, the Company entered into an amended and restated $650.0 million senior secured credit facility with a syndicate of banks. In February 2018 and December 2018, the Company amended this facility (the "amended Credit Facility"). Bank of America, N.A. served as the sole administrative agent and U.S. Bank National Association, PNC Bank, National Association and Compass Bank acted as co-syndication agents. Merrill Lynch Pierce Fenner & Smith Incorporated, U.S. Bank National Association, PNC Capital Markets, LLC and Compass Bank acted as joint lead arrangers and joint book managers in the syndication of the amended Credit Facility.

The amended Credit Facility consists of a $300.0 million five-year revolving line of credit and a $308.4 million five-year term loan facility. Interest terms from the Company's original credit facility did not change under the amendment. The amended Credit Facility also: (i) extended the expiration date of the original credit facility and the amortization period for the term loan facility from October 2020 to February 2023; (ii) approved the sale of Bayou; and (iii) updated the defined terms to allow for the add-back of certain charges related to the 2017 Restructuring when calculating the Company's compliance with the financial covenants. As required by the amended Credit Facility, net cash proceeds of $35 million from the sale of Bayou were applied against the outstanding borrowings on the revolving line of credit during 2018. Additionally, and in conjunction with the sale, the maximum aggregate principal amount of the revolving line of credit was permanently reduced from $300.0 million to $275.0 million.

During 2018, the Company paid expenses of $3.1 million associated with the amended Credit Facility, $1.4 million related to up-front lending fees and $1.7 million related to third-party arranging fees and expenses, the latter of which was recorded in "Interest expense" in the Consolidated Statement of Operations in 2018. In addition, the Company had $2.4 million in unamortized loan costs associated with the original Credit Facility, of which $0.6 million was written off and recorded in "Interest expense" in the Consolidated Statement of Operations in 2018.

Generally, interest is charged on the principal amounts outstanding under the amended Credit Facility at the British Bankers Association LIBOR rate plus an applicable rate ranging from 1.25% to 2.25% depending on the Company's consolidated leverage ratio. The Company can also opt for an interest rate equal to a base rate (as defined in the credit documents) plus an applicable rate, which is also based on the Company's consolidated leverage ratio. The applicable LIBOR borrowing rate (LIBOR plus Company's applicable rate) as of December 31, 2018 was approximately 4.45%.

The Company's indebtedness at December 31, 2018 consisted of $282.2 million outstanding from the $308.4 million term loan under the amended Credit Facility, $31.0 million on the line of credit under the amended Credit Facility and $1.0 million of third-party notes and bank debt. During 2018, the Company had net repayments on the line of credit of $7.0 million, which included a $35.0 million repayment from the proceeds on the Bayou sale, net of borrowings of $28.0 million for domestic working capital needs.

As of December 31, 2018, the Company had $27.9 million in letters of credit issued and outstanding under the amended Credit Facility. Of such amount, $12.3 million was collateral for the benefit of certain of our insurance carriers and $15.5 million was for letters of credit or bank guarantees of performance or payment obligations of foreign subsidiaries.

The Company's indebtedness at December 31, 2017 consisted of $308.4 million outstanding from the term loan under the Credit Facility, $38.0 million on the line of credit under the Credit Facility and $0.9 million of third-party notes and bank debt. Additionally, the Company had $7.8 million of debt held by a joint venture (representing funds loaned by its joint venture partner) listed as held for sale at December 31, 2017 related to the planned sale of Bayou.

At December 31, 2018 and 2017, the estimated fair value of the Company’s long-term debt was approximately $307.7 million and $356.0 million, respectively. Fair value was estimated using market rates for debt of similar risk and maturity and a discounted cash flow model, which are based on Level 3 inputs as defined in Note 13.

In October 2015, the Company entered into an interest rate swap agreement for a notional amount of $262.5 million, which is set to expire in October 2020. The notional amount of this swap mirrors the amortization of a $262.5 million portion of the Company's $350.0 million term loan drawn from the original Credit Facility. The swap requires the Company to make a monthly fixed rate payment of 1.46% calculated on the amortizing $262.5 million notional amount, and provides for the Company to receive a payment based upon a variable monthly LIBOR interest rate calculated on the same amortizing $262.5 million notional amount. The receipt of the monthly LIBOR-based payment offsets a variable monthly LIBOR-based interest cost on a corresponding $262.5 million portion of the Company's term loan from the original Credit Facility. After considering the impact of the interest rate swap agreement, the effective borrowing rate on the Company's term note as of December 31, 2018 was approximately 3.79%. This interest rate swap is used to partially hedge the interest rate risk associated with the volatility of monthly LIBOR rate movement and is accounted for as a cash flow hedge. See Note 13.

On March 12, 2018, the Company entered into an interest rate swap forward agreement that begins in October 2020 and expires in February 2023 to coincide with the amortization period of the amended Credit Facility. The swap will require the Company to make a monthly fixed rate payment of 2.937% calculated on the then amortizing $170.6 million notional amount, and provides for the Company to receive a payment based upon a variable monthly LIBOR interest rate calculated on the same amortizing $170.6 million notional amount. The receipt of the monthly LIBOR-based payment will offset the variable monthly LIBOR-based interest cost on a corresponding $170.6 million portion of the Company's term loan from the amended Credit Facility. This interest rate swap will be used to partially hedge the interest rate risk associated with the volatility of monthly LIBOR rate movement and accounted for as a cash flow hedge. See Note 13.

The amended Credit Facility is subject to certain financial covenants, including a consolidated financial leverage ratio and consolidated fixed charge coverage ratio. Subject to the specifically defined terms and methods of calculation as set forth in the amended Credit Facility's credit agreement, the financial covenant requirements, as of each quarterly reporting period end, are defined as follows:

- Consolidated financial leverage ratio, as amended, compares consolidated funded indebtedness to amended Credit Facility defined income with a maximum amount not to exceed 3.5 to 1.00. At December 31, 2018, the Company's consolidated financial leverage ratio was 2.94 to 1.00 and, using the amended Credit Facility defined income, the Company had the capacity to borrow up to $61.6 million of additional debt.
- Consolidated fixed charge coverage ratio, as amended, compares amended Credit Facility defined income to amended Credit Facility defined fixed charges with a minimum permitted ratio of not less than 1.25 to 1.00. At December 31, 2018, the Company's fixed charge ratio was 1.42 to 1.00.

At December 31, 2018, the Company was in compliance with all of its debt and financial covenants as required under the amended Credit Facility.

9. STOCKHOLDERS' EQUITY

Share Repurchase Plan

In October 2017, the Company's board of directors authorized the open market repurchase of up to $40.0 million of the Company's common stock to be made during 2018. That authorization was reduced to $30 million in 2018 in connection with the execution of the amended Credit Facility. The Company began repurchasing shares under this program in January 2018. In December 2018, the Company's board of directors authorized the open market repurchase of up to two million shares of the Company's common stock. The program did not establish a time period in which the repurchases had to be made. In December 2018, the Company amended its Credit Facility, which limits the open market share repurchases to $32.0 million for 2019. Once repurchased, the Company promptly retires such shares.

The Company is also authorized to repurchase up to $10.0 million of the Company's common stock in each calendar year in connection with the Company's equity compensation programs for employees. The participants in the Company's equity plans may surrender shares of common stock in satisfaction of tax obligations arising from the vesting of restricted stock and restricted stock unit awards under such plans and in connection with the exercise of stock option awards. The deemed price paid is the closing price of the Company's common stock on The Nasdaq Global Select Market on the date that the restricted stock or restricted stock unit vests or the shares of the Company's common stock are surrendered in exchange for stock option exercises. With regard to stock option awards, the option holder may elect a “net, net” exercise in connection with the exercise of employee stock options such that the option holder receives a number of shares equal to the built-in gain in the option shares divided by the market price of the Company’s common stock on the date of exercise, less a number of shares equal to the taxes due upon the exercise of the option divided by the market price of the Company’s common stock on the date of exercise. The shares of Company common stock surrendered to the Company for taxes due on the exercise of the option are deemed repurchased by the Company.

During 2018, the Company acquired 949,464 shares of the Company's common stock for $20.3 million ($21.36 average price per share) through the open market repurchase programs discussed above and 228,068 shares of the Company's common stock for $5.5 million ($24.08 average price per share) in connection with the satisfaction of tax obligations in connection with the vesting of restricted stock and restricted stock units. Once repurchased, the Company immediately retired all such shares. During 2018, the Company did not acquire any of the Company's common stock in connection with "net, net" exercises of employee stock options.

During 2017, the Company acquired 1,599,093 shares of the Company's common stock for $35.3 million ($22.10 average price per share) through open market repurchase programs and 112,899 shares of the Company's common stock for $2.5 million ($22.15 average price per share) in connection with the satisfaction of tax obligations in connection with the vesting of restricted stock and restricted stock units. Once repurchased, the Company immediately retired all such shares. During 2017, the Company did not acquire any of the Company's common stock in connection with "net, net" exercises of employee stock options.

During 2016, the Company acquired 2,226,875 shares of the Company's common stock for $41.8 million ($18.76 average price per share) through open market repurchase programs and 61,039 shares of the Company's common stock for $1.2 million ($19.65 average price per share) in connection with the satisfaction of tax obligations in connection with the vesting of restricted stock and restricted stock units. In addition, during 2016, the Company acquired 61,980 shares of the Company's common stock in connection with "net, net" exercises of employee stock options for a gross value of $1.5 million ($1.2 million in cash value). Once repurchased, the Company immediately retired all such shares.

Equity-Based Compensation Plans

Employee Plans

In April 2016, the Company's stockholders approved the 2016 Employee Equity Incentive Plan, which was amended in 2017 by the First Amendment to the 2016 Employee Equity Incentive Plan (as amended, the "2016 Employee Plan"). In April 2018, the Company's stockholders approved the Second Amendment to the 2016 Employee Equity Incentive Plan, which increased by 1,700,000 the number of shares of the Company's common stock reserved and available for issuance in connection with awards issued under the 2016 Employee Plan. The 2016 Employee Plan, which replaced the 2013 Employee Equity Incentive Plan, provides for equity-based compensation awards, including restricted shares of common stock, performance awards, stock options, stock units and stock appreciation rights. The 2016 Employee Plan is administered by the compensation committee of the board of directors, which determines eligibility, timing, pricing, amount and other terms or conditions of awards. As of December 31, 2018, 2,749,367 shares of the Company's common stock were available for issuance under the 2016 Employee Plan.

Prior to the 2016 Employee Plan, the board of directors administered the 2013 Employee Equity Incentive Plan (the "2013 Employee Plan") and the 2009 Employee Equity Incentive Plan (the "2009 Employee Plan"). At December 31, 2018, there were no options and 412,327 unvested shares of restricted stock and restricted stock units outstanding under the 2013 Employee Plan, and 52,783 options and no unvested shares of restricted stock and restricted stock units outstanding under the 2009 Employee Plan.

Director Plans

In April 2016, the Company's stockholders also approved the 2016 Non-Employee Director Equity Incentive Plan (the "2016 Director Plan"), which replaced the 2011 Non-Employee Director Equity Incentive Plan. The 2016 Director Plan provides for equity-based compensation awards, including non-qualified stock options and stock units. The board of directors administers the 2016 Director Plan and has the authority to establish, amend and rescind any rules and regulations related to the 2016 Director Plan. As of December 31, 2018, 71,580 shares of the Company's common stock were available for issuance under the 2016 Director Plan.

Prior to the 2016 Director Plan, the board of directors administered the 2011 Non-Employee Director Equity Plan ("2011 Director Plan"), the 2006 Non-Employee Director Equity Plan ("2006 Director Plan") and the 2001 Non-Employee Director Equity Plan ("2001 Director Plan"), all of which contained substantially the same provisions as the current plan. At December 31, 2018, there were 91,058 deferred stock units outstanding under the 2011 Director Plan, 46,841 deferred stock units outstanding under the 2006 Director Plan and 54,575 deferred stock units outstanding under the 2001 Director Equity Plan.

Activity and related expense associated with these plans are described in Note 10.

10. EQUITY-BASED COMPENSATION

Stock Awards

Stock awards, which include shares of restricted stock, restricted stock units and performance stock units, are awarded from time to time to executive officers and certain key employees of the Company. Stock award compensation is recorded based on the award date fair value and charged to expense ratably through the requisite service period. The forfeiture of unvested restricted stock, restricted stock units and performance stock units causes the reversal of all previous expense recorded as a reduction of current period expense.

A summary of stock award activity is as follows:

	Years Ended December 31,					
	2018		2017		2016	
	Stock Awards	Weighted Average Award Date Fair Value	Stock Awards	Weighted Average Award Date Fair Value	Stock Awards	Weighted Average Award Date Fair Value
Outstanding, beginning of year	1,428,878	$ 21.53	1,501,021	$ 20.58	1,275,707	$ 20.54
Restricted stock units awarded	281,567	24.13	257,532	23.06	335,026	18.43
Performance stock units awarded	219,943	23.25	213,436	28.18	245,586	25.69
Restricted shares distributed	—		(179,169)	22.44	(162,554)	23.49
Restricted stock units distributed	(312,182)	17.47	(95,510)	20.71	(23,739)	20.73
Performance stock units distributed	(296,909)	21.55	(49,672)	21.95	—	—
Restricted shares forfeited	—	—	(1,084)	23.01	(22,045)	23.34
Restricted stock units forfeited	(90,896)	21.79	(81,626)	20.36	(71,992)	17.60
Performance stock units forfeited	(87,196)	25.95	(136,050)	24.29	(74,968)	22.64
Outstanding, end of year	1,143,205	$ 23.26	1,428,878	$ 21.53	1,501,021	$ 20.58

Expense associated with stock awards was $6.8 million, $9.0 million and $9.1 million in 2018, 2017 and 2016, respectively. Unrecognized pre-tax expense of $9.9 million related to stock awards is expected to be recognized over the weighted average remaining service period of 2.4 years for awards outstanding at December 31, 2018.

Deferred Stock Unit Awards

Deferred stock units generally are awarded to directors of the Company and represent the Company's obligation to transfer one share of the Company's common stock to the grantee at a future date and generally are fully vested on the date of grant. The expense related to the issuance of deferred stock units is recorded as of the date of the award.

A summary of deferred stock unit activity is as follows:

	Years Ended December 31,					
	2018		2017		2016	
	Deferred Stock Units	Weighted Average Award Date Fair Value	Deferred Stock Units	Weighted Average Award Date Fair Value	Deferred Stock Units	Weighted Average Award Date Fair Value
Outstanding, beginning of year	269,977	$ 20.14	253,445	$ 19.93	247,219	$ 19.92
Awarded	45,681	23.72	47,091	23.53	45,886	21.22
Shares distributed	(28,308)	19.22	(30,559)	23.57	(39,660)	21.29
Outstanding, end of year	287,350	$ 22.80	269,977	$ 20.14	253,445	$ 19.93

Expense associated with awards of deferred stock units was $1.1 million, $1.1 million and $1.0 million in 2018, 2017 and 2016, respectively.

Stock Options

Stock options on the Company’s common stock are awarded from time to time to executive officers and certain key employees of the Company. Stock options granted generally have a term of seven to ten years and an exercise price equal to the market value of the underlying common stock on the date of grant.

A summary of stock option activity is as follows:

	Years Ended December 31,					
	2018		2017		2016	
	Shares	Weighted Average Exercise Price	Shares	Weighted Average Exercise Price	Shares	Weighted Average Exercise Price
Outstanding, beginning of year	126,680	$ 23.06	170,253	$ 21.99	288,383	$ 21.73
Exercised	—	—	(43,573)	18.87	(114,307)	21.33
Canceled/Expired	(73,897)	26.60	—	—	(3,823)	22.24
Outstanding, end of year	52,783	$ 18.11	126,680	$ 23.06	170,253	$ 21.99
Exercisable, end of year	52,783	$ 18.11	126,680	$ 23.06	170,253	$ 21.99

In 2018, 2017 and 2016, the Company recorded expense of zero[2], zero[2] and less than $0.1 million, respectively, related to stock option grants. Unrecognized pre-tax expense related to stock option grants was zero at December 31, 2018.

Financial data for stock option exercises are summarized in the following table (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Amount collected from stock option exercises	$ —	$ 822	$ 306
Total intrinsic value of stock option exercises	—	370	47
Tax benefit of stock option exercises recorded in income tax expense [1]	1,5[illegible]	[illegible]	—
Tax benefit of stock option exercises recorded in additional paid-in-capital [1]	—	—	315
Aggregate intrinsic value of outstanding stock options	—	386	102
Aggregate intrinsic value of exercisable stock options	—	386	102

---

(1) As of January 1, 2017, the Company adopted FASB Accounting Standards Update No. 2016-09, Compensation - Stock Compensation (Topic 718): Improvements to Employee Share-Based Payment Accounting, which, among other items, changed the accounting for the tax benefit of stock option exercises so that it is now recorded as part of current earnings rather than additional paid-in capital. Prior period balances were not retrospectively adjusted.

(2) In 2018 and 2017 there were no expenses related to stock options as all issued stock options were fully vested at December 31, 2017 and expire in 2019.

The intrinsic value calculations are based on the Company’s closing stock price of $16.32, $25.43 and $23.70 on December 31, 2018, 2017 and 2016, respectively.

11. TAXES ON INCOME

Income (loss) before taxes on income was as follows (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Domestic	$ 8,142	$ (40,007)	$ 23,170
Foreign	(5,187)	(21,570)	12,064
Total	$ 2,955	$ (61,577)	$ 35,234

Provisions for taxes on income (loss) consisted of the following components (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Current:			
Federal	$(4,765)	$3,764	$(636)
Foreign	6,025	7,512	3,585
State	(651)	3,351	175
Subtotal	609	14,627	3,124
Deferred:			
Federal	947	(8,706)	2,158
Foreign	(1,531)	(1,099)	475
State	(157)	183	352
Subtotal	(741)	(9,622)	2,985
Total tax provision	$(132)	$5,005	$6,109

Income tax expense differed from the amounts computed by applying the U.S. federal income tax rate of 21% for 2018 and 35% for 2017 and 2016 to income (loss) before taxes on income as a result of the following (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Income taxes (benefit) at U.S. federal statutory tax rate	$621	$(21,552)	$12,332
Increase (decrease) in taxes resulting from:			
Change in the balance of the valuation allowance for deferred tax assets allocated to foreign income tax expense	590	4,598	1,364
Change in the balance of the valuation allowance for deferred tax assets allocated to domestic income tax expense	(944)	12,755	(4,202)
State income taxes, net of federal income tax benefit	(798)	2,270	342
Divestitures	2,133	—	271
Meals and entertainment	517	785	736
Changes in taxes previously accrued	(536)	(1,339)	23
Foreign tax rate differences	1,301	913	(2,559)
Share-based compensation	(1,427)	131	(90)
Goodwill impairment	291	6,359	—
Recognition of uncertain tax positions	(218)	(62)	85
Deemed mandatory repatriation	(842)	10,406	—
Release of deferred tax liability on foreign earnings	—	(7,051)	—
Domestic Production Activities deduction	—	(1,921)	(1,017)
Other matters	(820)	(1,287)	(1,176)
Total tax provision	$(132)	$5,005	$6,109
Effective tax rate	(4.5)%	(8.1)%	17.3%

On December 22, 2017, the U.S. government enacted the TCJA, which includes significant changes to the U.S. corporate income tax system including: (i) a federal corporate rate reduction from 35% to 21%; (ii) limitations on the deductibility of interest expense and executive compensation; (iii) creation of new minimum taxes such as the Global Intangible Low Taxed Income (“GILTI”) tax and the base erosion anti-abuse tax (“BEAT”); and (iv) the transition of U.S. international taxation from a worldwide tax system to a modified territorial tax system, which resulted in a one time U.S. tax liability on those earnings that have not previously been repatriated to the U.S. Beginning in 2018, the Company no longer records U.S. federal income tax on its share of income from foreign subsidiaries and no longer records a benefit for foreign tax credits related to that income.

In its reporting since the TCJA was enacted, the Company had been recording provisional amounts for certain enactment-date effects of the TCJA by applying the guidance in SAB 118 because the enactment-date accounting for these effects had not yet been completed. In 2018 and 2017, the Company recorded a net tax expense related to the enactment-date effects of the TCJA that included recording the one-time transition tax liability related to undistributed earnings of certain foreign subsidiaries that were not previously taxed and adjusting deferred tax assets and liabilities for the changes in the federal tax rate.

The one-time transition tax is based on total post-1986 earnings and profits (“E&P”) that were previously deferred from U.S. income taxes. The tax is based on the amount of those earnings held in cash and other specified assets, either at the end of 2017 or the average of the year end balances for 2015 and 2016. Based on the Company’s initial analysis of the TCJA in 2017, it recorded a provisional estimated net tax expense of $2.4 million, which consisted of a charge of $10.4 million for the deemed mandatory repatriation, and reduced by a $7.1 million release of a deferred tax liability on unremitted foreign earnings and $0.9 million of other TCJA related impacts. Upon further analysis of the TCJA and notices and regulations issued and proposed by the U.S. Department of the Treasury and the Internal Revenue Service (“IRS”), the Company finalized its calculations of the transition tax liability during 2018. Adjustments included further refinement of computations related to earnings and profits, cash and cash equivalents, state income tax and foreign withholding taxes pursuant to guidance issued during the year. The final transition tax liability consisted of a charge of $9.6 million for the deemed mandatory repatriation, and reduced by the $7.1 million release of a deferred tax liability on unremitted foreign earnings and $2.0 million of other TCJA related impacts. The Company decreased its December 31, 2017 provisional amount by $1.9 million during 2018, which is included as a component of income tax expense.

The transition tax liability, as filed on the 2017 federal income tax return and after utilization of foreign tax credits, was $5.2 million. Although Congressional intent and the statutory language were clear that the transition tax could be paid over a period of eight years, and the Company properly elected to pay the transition tax liability over a period of eight years, IRS guidance published in April 2018 indicated that taxpayers in a net overpayment position would have all overpayments first applied to successive installments of the transition tax liability. Legislative proposals were passed in the U.S. House of Representatives in late December 2018 to correct the application of this IRS guidance; however there has been no action in the U.S. Senate to pass legislation addressing this issue. As a result of the overpayment from 2017 and the anticipated utilization of 2018 foreign tax credits, no further tax payments related to the transition tax will be required.

Net deferred taxes consisted of the following (in thousands):

	December 31, 2018	December 31, 2017
Deferred income tax assets:		
Foreign tax credit carryforwards	$507	$466
Net operating loss carryforwards	22,909	23,216
Accrued expenses	12,987	12,107
Other	8,652	4,707
Total gross deferred income tax assets	45,055	40,496
Less valuation allowance	(28,451)	(29,782)
Net deferred income tax assets	16,604	10,714
Deferred income tax liabilities:		
Property, plant and equipment	(6,038)	(9,482)
Intangible assets	(10,609)	(2,201)
Other	(6,757)	(6,576)
Total deferred income tax liabilities	(23,404)	(18,259)
Net deferred income tax liabilities	$(6,800)	$(7,545)

The Company’s tax assets and liabilities, netted by taxing location, are in the following captions in the balance sheets (in thousands):

	December 31,	
	2018	2017
Noncurrent deferred income tax assets, net	$1,561	$1,666
Noncurrent deferred income tax liabilities, net	(8,361)	(9,211)
Net deferred income tax liabilities	$(6,800)	$(7,545)

The Company’s deferred tax assets at December 31, 2018 included $22.9 million in federal, state and foreign net operating loss (“NOL”) carryforwards. These NOLs include $14.3 million, which if not used will expire between the years 2019 and 2038, and $8.6 million that have no expiration dates. The Company also has deferred tax amounts related to foreign tax credit carryforwards of $0.5 million, of which, $0.4 million will expire in 2026 if not used and $0.1 million have no expiration date.

For financial reporting purposes, a valuation allowance of $28.5 million has been recognized to reduce the deferred tax assets related to certain federal, state and foreign net operating loss carryforwards and other assets, for which it is more likely than not that the related tax benefits will not be realized, due to uncertainties as to the timing and amounts of future taxable income. The valuation allowance at December 31, 2017 was $29.8 million.

As of December 31, 2018, a valuation allowance has been recorded to record only the portion of the deferred tax asset that is more likely than not to be realized. The amount of the deferred tax asset considered realizable; however, could be adjusted if estimates of future taxable income during the carryforward period are reduced or increased or if objective negative evidence in the form of cumulative losses is no longer present and additional weight may be given to subjective evidence such as our projections for growth.

Activity in the valuation allowance is summarized as follows (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Balance, at beginning of year	$29,782	$15,428	$18,897
Additions	1,879	19,260	3,095
Reversals	(2,102)	(183)	(4,984)
Remeasurement of U.S. deferred tax balances	—	(5,141)	—
Other adjustments	(1,108)	418	(1,580)
Balance, at end of year	$28,451	$29,782	$15,428

As a result of the deemed mandatory repatriation provisions in the TCJA, the Company included $206.7 million of undistributed earnings in income subject to U.S. tax at reduced tax rates. Certain provisions within the TCJA effectively transition the U.S. to a territorial system and eliminates deferral on U.S. taxation for certain amounts of income that are not taxed at a minimum level. At this time, the Company does not intend to distribute earnings in a taxable manner; and therefore, intends to limit distributions to: (i) earnings previously taxed in the U.S.; (ii) earnings that would qualify for the 100 percent dividends received deduction provided in the TCJA; or (iii) earnings that would not result in significant foreign taxes. As a result, the Company has not recognized a deferred tax liability on any remaining undistributed foreign earnings as of December 31, 2018.

FASB ASC 740, Income Taxes (“FASB ASC 740”), prescribes a more-likely-than-not threshold for the financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. FASC ASC 740 also provides guidance on de-recognition, classification, interest and penalties, accounting in interim periods and disclosure of uncertain tax positions in financial statements.

A reconciliation of the beginning and ending balance of unrecognized tax benefits is as follows (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Balance, at beginning of year	$2,229	$2,465	$2,410
Additions for tax positions of prior years related to acquisitions	—	—	148
Additions for tax positions of prior years	8	12	10
Lapse in statute of limitations	(264)	(274)	(83)
Foreign currency translation	(18)	26	(20)
Balance, at end of year, total tax provision	$1,955	$2,229	$2,465

The total amount of unrecognized tax benefits, if recognized, that would affect the effective tax rate was $0.4 million at December 31, 2018.

The Company recognizes interest and penalties, if any, related to unrecognized tax benefits in income tax expense. During the years ended December 31, 2018, 2017 and 2016, approximately $0.2 million, $0.3 million and $0.3 million, respectively, was expensed for interest and penalties.

The Company believes that it is reasonably possible that the total amount of unrecognized tax benefits will change in 2018. The Company has certain tax return years subject to statutes of limitation that will expire within twelve months. Unless challenged by tax authorities, the expiration of those statutes of limitation is expected to result in the recognition of uncertain tax positions in the amount of approximately $0.8 million.

The Company is subject to taxation in the United States, various states and foreign jurisdictions. With few exceptions, the Company is no longer subject to U.S. federal, state, local or foreign examinations by tax authorities for years before 2014.

12. COMMITMENTS AND CONTINGENCIES

Leases

The Company leases a number of its administrative and operations facilities under non-cancellable operating leases expiring at various dates through 2025. In addition, the Company leases certain construction, automotive and computer equipment on a multi-year, monthly or daily basis. Rental expense in the years ended December 31, 2018, 2017 and 2016 was $26.2 million, $26.7 million and $23.8 million, respectively.

At December 31, 2018, the future minimum lease payments required under the non-cancellable operating leases were as follows (in thousands):

Year	Minimum Lease Payments
2019	$ 19,843
2020	15,055
2021	11,492
2022	8,111
2023	5,365
Thereafter	7,203
Total	$ 67,069

Litigation

In December 2016, the Company settled two lawsuits related to the December 2012 departure of several key leaders in sales and operations for the Tyfo® technology, which is part of the Infrastructure Solutions platform. Under the settlement, Aegion will receive $6.6 million over four years; and accordingly, recorded the gain to “Gain on litigation settlement” in the Consolidated Statement of Operations. The initial $3.6 million cash payment was received in December 2016, with the remainder to be paid in $750,000 annual installments over the following four years. At December 31, 2018, $750,000 was recorded to “Prepaid expenses and other current assets” and $1.5 million was recorded to “Other assets” in the Consolidated Balance Sheet.

101

The Company is involved in certain litigation incidental to the conduct of its business and affairs. Management, after consultation with legal counsel, does not believe that the outcome of any such litigation, individually or in the aggregate, will have a material adverse effect on the Company's consolidated financial condition, results of operations or cash flows.

Contingencies

In connection with the Brinderson acquisition, certain pre-acquisition matters were identified in 2014 whereby a loss is both probable and reasonably estimable. The Company establishes liabilities in accordance with FASB ASC Subtopic No. 450-20, Contingencies - Loss Contingencies, and accordingly, recorded an accrual related to various legal, tax, employee benefits and employment matters. At December 31, 2016, the accrual relating to these matters was $6.0 million. During 2017, the Company made a $0.3 million payment related to one of the above matters. Additionally, the Company reassessed its reserve during 2017 for: (i) the lapse of certain payroll tax statutory limitation periods; and (ii) further developments in the legal status of these matters, including the preliminary settlement through mediated resolution of several matters. Following consultation with internal and third-party legal and tax counsel, the Company lowered its accrual for such matters by $1.5 million during 2017. The accrual adjustments resulted in an offset to "Operating expense" in the Consolidated Statement of Operations. During 2018, the Company made an additional $0.2 million payment related to one of the above matters. As of December 31, 2018, the remaining accrual relating to these matters was $4.0 million.

Purchase Commitments

The Company had no material purchase commitments at December 31, 2018.

Guarantees

The Company has many contracts that require the Company to indemnify the other party against loss from claims, including claims of patent or trademark infringement or other third party claims for injuries, damages or losses. The Company has agreed to indemnify its surety against losses from third-party claims of subcontractors. The Company has not previously experienced material losses under these provisions and, while there can be no assurances, currently does not anticipate any future material adverse impact on its consolidated financial position, results of operations or cash flows.

The Company regularly reviews its exposure under all its engagements, including performance guarantees by contractual joint ventures and indemnification of its surety. As a result of the most recent review, the Company has determined that the risk of material loss is remote under these arrangements and has not recorded a liability for these risks at December 31, 2018 on its consolidated balance sheet.

Retirement Plans

Approximately 1,100 of our U.S. employees participate in multi-employer retirement plans. Substantially all of the Company's remaining U.S. employees are eligible to participate in one of the Company's sponsored defined contribution savings plans, which are qualified plans under the requirements of Section 401(k) of the Internal Revenue Code. Company contributions to the domestic plans were $5.7 million, $6.3 million and $5.5 million for the years ended December 31, 2018, 2017 and 2016, respectively.

Certain foreign subsidiaries maintain various other defined contribution retirement plans. Company contributions to such plans for the years ended December 31, 2018, 2017 and 2016 were $1.1 million, $1.0 million and $0.8 million, respectively.

In connection with the Company's 2009 acquisition of Corrpro, the Company assumed an obligation associated with a contributory defined benefit pension plan sponsored by a subsidiary of Corrpro located in the United Kingdom. Employees of this Corrpro subsidiary no longer accrue benefits under the plan; however, Corrpro continues to be obligated to fund prior period benefits. Both the pension expense and funding requirements for the years ended December 31, 2018, 2017 and 2016 were immaterial to the Company's consolidated financial position and results of operations. The benefit obligation and plan assets at December 31, 2018 were approximately $7.1 million and $7.9 million, respectively. The Company used a discount rate of 2.8% for the evaluation of the pension liability. The Company recorded an asset associated with the overfunded status of this plan of approximately $0.8 million, which is included in other long-term assets on the consolidated balance sheet. The benefit obligation and plan assets at December 31, 2017 approximated $7.5 million and $9.3 million, respectively. Plan assets consist of investments in equity and debt securities as well as cash, which are primarily Level 2 inputs as defined in Note 13.

13. DERIVATIVE FINANCIAL INSTRUMENTS

As a matter of policy, the Company uses derivatives for risk management purposes, and does not use derivatives for speculative purposes. From time to time, the Company may enter into foreign currency forward contracts to hedge foreign currency cash flow transactions. For cash flow hedges, gain or loss is recorded in the Consolidated Statements of Operations upon settlement of the hedge. All of the Company's hedges that are designated as hedges for accounting purposes were highly effective; therefore, no notable amounts of hedge ineffectiveness were recorded in the Company's Consolidated Statements of Operations for either the settlement of cash flow hedges or the outstanding hedged balance. At December 31, 2018 and 2017, the Company's cash flow hedges were in a net deferred gain position of $1.8 million and $3.2 million, respectively, due to favorable movements in short-term interest rates relative to the hedged position. The Company presents derivative instruments in the consolidated financial statements on a gross basis. Deferred gains and losses were recorded in other non-current assets and other non-current liabilities, respectively, and other comprehensive income on the Consolidated Balance Sheets. The net periodic change of the Company's cash flow hedges was recorded on the foreign currency translation adjustment and derivative transactions line of the Consolidated Statements of Equity.

The Company also engages in regular inter-company trade activities and receives royalty payments from certain of its wholly-owned entities, paid in local currency, rather than the Company's functional currency, U.S. Dollars. The Company utilizes foreign currency forward exchange contracts to mitigate the currency risk associated with the anticipated future payments from certain of its international entities. During 2018, 2017 and 2016, losses of $0.5 million, $0.1 million and $0.1 million, respectively, were recorded upon settlement of foreign currency forward exchange contracts. Gains and losses of this nature are recorded to "Other income (expense)" in the Consolidated Statements of Operations.

In October 2015, the Company entered into an interest rate swap agreement for a notional amount of $262.5 million, which is set to expire in October 2020. The notional amount of this swap mirrors the amortization of a $262.5 million portion of the Company's $350.0 million term loan drawn from the original Credit Facility. The swap requires the Company to make a monthly fixed rate payment of 1.46% calculated on the amortizing $262.5 million notional amount and provides for the Company to receive a payment based upon a variable monthly LIBOR interest rate calculated by amortizing the $262.5 million same notional amount. The receipt of the monthly LIBOR-based payment offsets a variable monthly LIBOR-based interest cost on a corresponding $262.5 million portion of the Company's term loan from the original Credit Facility. This interest rate swap is used to partially hedge the interest rate risk associated with the volatility of monthly LIBOR rate movement and is accounted for as a cash flow hedge.

On March 12, 2018, the Company entered into an interest rate swap forward agreement that begins in October 2020 and expires in February 2023 to coincide with the amortization period of the amended Credit Facility. The swap will require the Company to make a monthly fixed rate payment of 2.937% calculated on the then amortizing $170.6 million notional amount, and provides for the Company to receive a payment based upon a variable monthly LIBOR interest rate calculated on the same amortizing $170.6 million notional amount. The receipt of the monthly LIBOR-based payment will offset the variable monthly LIBOR-based interest cost on a corresponding $170.6 million portion of the Company's term loan from the amended Credit Facility. This interest rate swap will be used to partially hedge the interest rate risk associated with the volatility of monthly LIBOR rate movement and accounted for as a cash flow hedge.

The following table summarizes the Company's derivative positions at December 31, 2018:

	Position	Notional Amount	Weighted Average Remaining Maturity In Years	Average Exchange Rate
USD/British Pound	Sell	£1,962,900	0.3	1.28
EURO/British Pound	Sell	£2,568,300	0.3	1.11
Interest Rate Swap		$211,640,625	4.0	

The following table summarizes the fair value amounts of the Company's derivative instruments, all of which are Level 2 (as defined below) inputs (in thousands):

Designation of Derivatives	Balance Sheet Location	December 31, 2018	2017
Derivatives Designated as Hedging Instruments:			
Forward Currency Contracts	Prepaid expenses and other current assets	$—	$176
Interest Rate Swaps	Other non-current assets	3,648	3,193
	Total Assets	$3,648	$3,369
Forward Currency Contracts	Accrued expenses	$—	$33
Interest Rate Swaps	Other non-current liabilities	1,885	—
	Total Liabilities	$1,885	$33
Derivatives Not Designated as Hedging Instruments:			
Forward Currency Contracts	Prepaid expenses and other current assets	$—	$10
	Total Assets	$—	$10
Forward Currency Contracts	Accrued expenses	$44	$—
	Total Liabilities	44	
	Total Derivative Assets	$3,648	$3,379
	Total Derivative Liabilities	1,929	33
	Total Net Derivative Asset (Liability)	$1,719	$3,346

FASB ASC 820, Fair Value Measurements ("FASB ASC 820"), defines fair value and establishes a framework for measuring and disclosing fair value instruments. The guidance establishes a three-tier fair value hierarchy, which prioritizes the inputs used in measuring fair value. These tiers include:

- Level 1 – defined as quoted prices in active markets for identical instruments;
- Level 2 – defined as inputs other than quoted prices in active markets that are either directly or indirectly observable;
- Level 3 – defined as unobservable inputs in which little or no market data exists, therefore requiring an entity to develop its own assumptions.

In accordance with FASB ASC 820, the Company determined that the value of all of its derivative instruments, which are measured at fair value on a recurring basis, are derived from significant observable inputs, referred to as Level 2 inputs.

The Company had no transfers between Level 1, 2 or 3 inputs during the quarter ended December 31, 2018. Certain financial instruments are required to be recorded at fair value. Changes in assumptions or estimation methods could affect the fair value estimates; however, the Company does not believe any such changes would have a material impact on its financial condition, results of operations or cash flows. Other financial instruments including cash and cash equivalents and short-term borrowings, including notes payable, are recorded at cost, which approximates fair value, which is based on Level 2 inputs as previously defined.

14. SEGMENT AND GEOGRAPHIC INFORMATION

The Company has three operating segments, which are also its reportable segments: Infrastructure Solutions; Corrosion Protection; and Energy Services. The Company's operating segments correspond to its management organizational structure. Each operating segment has leadership that reports to the chief operating decision manager ("CODM"). The operating results and financial information reported by each segment are evaluated separately, regularly reviewed and used by the CODM to evaluate segment performance, allocate resources and determine management incentive compensation.

The following disaggregated financial results have been prepared using a management approach that is consistent with the basis and manner with which management internally disaggregates financial information for the purpose of making internal operating decisions. The Company evaluates performance based on stand-alone operating income (loss), which includes acquisition and divestiture expenses, restructuring charges and an allocation of corporate-related expenses.

Financial information by segment was as follows (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Revenues:			
Infrastructure Solutions	$604,121	$612,154	$571,551
Corrosion Protection	393,740	456,139	401,469
Energy Services	335,707	290,726	248,900
Total revenues	$1,333,568	$1,359,019	$1,221,920
Gross profit:			
Infrastructure Solutions	$132,411	$140,823	$142,444
Corrosion Protection	92,968	108,240	83,269
Energy Services	41,547	35,749	28,214
Total gross profit	$266,926	$284,812	$253,927
Operating income (loss):			
Infrastructure Solutions (1)	$23,683	$(62,244)	$53,899
Corrosion Protection (2)	(1,867)	12,446	1,458
Energy Services (3)	7,831	6,278	(4,566)
Total operating income (loss)	29,647	(43,520)	50,791
Other income (expense):			
Interest expense	(17,327)	(16,001)	(15,029)
Interest income	516	145	166
Other	(9,881)	(2,201)	(694)
Total other expense	(26,692)	(18,057)	(15,557)
Income (loss) before taxes on income	$2,955	$(61,577)	$35,234
Total assets:			
Infrastructure Solutions	$500,977	$531,746	$584,425
Corrosion Protection	279,106	329,848	424,007
Energy Services	163,109	152,416	147,171
Corporate	41,432	22,775	37,979
Assets held for sale	7,793	70,314	—
Total assets	$992,417	$1,107,099	$1,193,582
Capital expenditures:			
Infrastructure Solutions	$12,730	$16,680	$19,834
Corrosion Protection	9,754	8,603	14,393
Energy Services	3,053	2,713	2,514
Corporate	4,977	2,834	2,019
Total capital expenditures	$30,514	$30,830	$38,760
Depreciation and amortization:			
Infrastructure Solutions	$16,758	$18,731	$17,547
Corrosion Protection	11,874	15,598	18,792
Energy Services	7,111	6,726	7,067
Corporate	2,112	3,364	3,313
Total depreciation and amortization	$37,855	$44,419	$46,719

105

(1) Operating income for 2018 includes: (i) $16.9 million of restructuring charges (see Note 4); and (ii) $0.8 million of cost incurred related to the disposition of Denmark. Operating loss for 2017 includes: (i) $18.1 million of restructuring charges (see Note 4); (ii) $45.4 million of goodwill impairment charges (see Note 2); (iii) $41.0 million of definite-lived intangible asset impairment charges (see Note 2); and (iv) $0.7 million of costs incurred related to the acquisition of Environmental Techniques. Operating income for 2016 includes: (i) $2.9 million of restructuring charges (see Note 4); (ii) $2.7 million of costs incurred related to the acquisitions of Underground Solutions, Fyfe Europe, LMJ and Concrete Solutions; (iii) inventory step up expense of $3.6 million recognized as part of the accounting for business combinations; and (iv) a gain of $6.6 million in connection with the settlement of two longstanding lawsuits (see Note 12).

(2) Operating income for 2018 includes: (i) $8.3 million of restructuring charges (see Note 4); and (ii) $6.2 million of costs incurred related to the divestiture of Bayou. Operating income for 2017 includes $5.9 million of restructuring charges (see Note 4) and (ii) $2.3 million of costs incurred related to the planned divestiture of Bayou. Operating income for 2016 includes $4.6 million of 2016 Restructuring charges (see Note 4).

(3) Operating income for 2018 includes $0.4 million of restructuring charges (see Note 4). Operating loss for 2016 includes $8.2 million of 2016 Restructuring charges.

The following table summarizes revenues, operating income (loss) and long-lived assets by geographic region (in thousands):

	Years Ended December 31,		
	2018	2017	2016
Revenues: [1]			
United States	$966,291	$1,028,313	$924,580
Canada	133,612	139,734	129,291
Europe	66,794	71,839	60,238
Other foreign	166,871	119,133	107,811
Total revenues	$1,333,568	$1,359,019	$1,221,920
Gross profit:			
United States	$178,024	$226,026	$194,079
Canada	22,823	31,173	28,047
Europe	8,379	11,997	11,605
Other foreign	57,700	15,616	20,196
Total gross profit	$266,926	$284,812	$253,927
Operating income (loss):			
United States	$174	$(33,583)	$28,013
Canada	9,482	12,220	16,156
Europe	(10,599)	(3,771)	1,089
Other foreign	30,590	(18,386)	5,533
Total operating income (loss)	$29,647	$(43,520)	$50,791
Long-lived assets: [1][2]			
United States	$105,978	$93,472	$140,099
Canada	7,725	8,816	9,464
Europe	8,295	13,435	7,575
Other foreign	6,662	9,586	8,829
Total long-lived assets	$128,660	$125,309	$165,967

(1) Revenues and long-lived assets are attributed to the country of origin for the Company's legal entities. For a significant majority of its legal entities, the country of origin relates to the country or geographic area that it services.

(2) Long-lived assets as of December 31, 2018, 2017 and 2016 do not include intangible assets, goodwill or deferred tax assets.

15. SELECTED QUARTERLY FINANCIAL DATA (UNAUDITED)

Unaudited quarterly financial data was as follows (in thousands, except per share data):

	First Quarter(1)	Second Quarter(2)	Third Quarter(3)	Fourth Quarter(4)
Year ended December 31, 2018:				
Revenues	$324,861	$335,030	$339,679	$333,998
Gross profit	61,504	71,053	72,673	61,696
Operating income (loss)	3,181	14,459	13,009	(1,002)
Net income (loss)	(1,476)	7,198	141	(2,776)
Earnings (loss) per share attributable to Aegion Corporation:				
Basic	$(0.06)	$0.24	$(0.01)	$(0.08)
Diluted	$(0.06)	$0.24	$(0.01)	$(0.08)

(1) Includes pre-tax expenses of $5.2 million related to our restructuring efforts (see Note 4).
(2) Includes pre-tax expenses of $2.9 million related to our restructuring efforts (see Note 4).
(3) Includes pre-tax expenses of $7.4 million related to our restructuring efforts (see Note 4).
(4) Includes pre-tax expenses of $13.9 million related to our restructuring efforts (see Note 4).

	First Quarter(1)	Second Quarter(2)	Third Quarter(3)	Fourth Quarter(4)
Year ended December 31, 2017:				
Revenues	$325,175	$354,473	$341,872	$337,499
Gross profit	67,412	79,768	73,442	64,190
Operating income (loss)	14,212	21,495	(75,271)	(3,956)
Net income (loss)	7,832	12,014	(74,044)	(12,384)
Earnings (loss) per share attributable to Aegion Corporation:				
Basic	$0.18	$0.33	$(2.23)	$(0.39)
Diluted	$0.17	$0.32	$(2.23)	$(0.39)

(1) Includes pre-tax expense reversals of $(0.1) million related to our restructuring efforts (see Note 4).
(2) Includes pre-tax expenses of $0.3 million related to our restructuring efforts (see Note 4).
(3) Includes pre-tax expenses of $6.7 million related to our restructuring efforts (see Note 4); pre-tax goodwill impairment charges of $45.4 million (see Note 2); and pre-tax definite-lived intangible asset impairment charges of $41.0 million (see Note 2).
(4) Includes pre-tax expenses of $17.1 million related to our restructuring efforts (see Note 4).

Item 9. Changes in and Disagreements with Accountants on Accounting and Financial Disclosure.
None.

Item 9A. Controls and Procedures.
Our management, under the supervision and with the participation of our Chief Executive Officer (our principal executive officer) and Chief Financial Officer (our principal financial officer), has conducted an evaluation of the effectiveness of the design and operation of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) of the Securities Exchange Act of 1934, as amended (the “Exchange Act”), as of December 31, 2018. Based upon and as of the date of this evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that our disclosure controls were effective to provide reasonable assurance that the information required to be disclosed by us in the reports that we file or submit under the Exchange Act (a) is recorded, processed, summarized and reported within the time period specified in the Securities and Exchange Commission’s rules and forms, and (b) is accumulated and communicated to our management, including our principal executive and principal financial officers, as appropriate to allow timely decisions regarding required disclosure.
Management’s report is included in Item 8 of this Report under the caption entitled “Management’s Report on Internal Control Over Financial Reporting,” and is incorporated herein by reference. The effectiveness of the Company’s internal control over financial reporting as of December 31, 2018 has been audited by PricewaterhouseCoopers LLP, an independent registered public accounting firm, as stated in its report which is included in Item 8 of this Report under the caption entitled “Report of Independent Registered Public Accounting Firm” and is incorporated herein by reference.

Changes in Internal Control Over Financial Reporting
There were no changes in our internal control over financial reporting that occurred during the quarter ended December 31, 2018 that materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Item 9B. Other Information.
Not applicable.

PART III

Item 10. Directors, Executive Officers and Corporate Governance.

Information concerning this item is included in "Item 4A. Executive Officers of the Registrant" of this Report and under the captions "Certain Information Concerning Director Nominees," "Section 16(a) Beneficial Ownership Reporting Compliance," "Corporate Governance—Corporate Governance Documents," "Corporate Governance—Board Meetings and Committees—Audit Committee" and "Corporate Governance—Board Meetings and Committees—Audit Committee Financial Expert" in our Proxy Statement for our 2019 Annual Meeting of Stockholders ("2019 Proxy Statement") and is incorporated herein by reference.

Item 11. Executive Compensation.

Information concerning this item is included under the captions "Executive Compensation," "Compensation in Last Fiscal Year," "Director Compensation," "Corporate Governance—Board Meetings and Committees—Compensation Committee Interlocks and Insider Participation" and "Compensation Committee Report" in the 2019 Proxy Statement and is incorporated herein by reference.

Item 12. Security Ownership of Certain Beneficial Owners and Management and Related Stockholder Matters.

Information concerning this item is included in Item 5 of this Report under the caption "Equity Compensation Plan Information" and under the caption "Information Concerning Certain Stockholders" in the 2019 Proxy Statement and is incorporated herein by reference.

Item 13. Certain Relationships and Related Transactions, and Director Independence.

Information concerning this item is included under the captions "Related-Party Transactions" and "Corporate Governance—Independent Directors" in the 2019 Proxy Statement and is incorporated herein by reference.

Item 14. Principal Accountant Fees and Services.

Information concerning this item is included under the caption "Independent Auditors' Fees" in the 2019 Proxy Statement and is incorporated herein by reference.

PART IV

Item 15. Exhibits and Financial Statement Schedules.

1. Financial Statements:

The consolidated financial statements filed in this Annual Report on Form 10-K are listed in the Index to Consolidated Financial Statements included in "Item 8. Financial Statements and Supplementary Data," which information is incorporated herein by reference.

2. Financial Statement Schedules:

No financial statement schedules are included herein because of the absence of conditions under which they are required or because the required information is contained in the consolidated financial statements or notes thereto contained in this Report.

3. Exhibits:

The exhibits required to be filed as part of this Annual Report on Form 10-K are listed in the Index to Exhibits attached hereto.

SIGNATURES

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the registrant has duly caused this Report to be signed on its behalf by the undersigned, thereunto duly authorized.

Dated: March 1, 2019 AEGION CORPORATION

By: /s/ Charles R. Gordon
Charles R. Gordon
President and Chief Executive Officer

POWER OF ATTORNEY

The registrant and each person whose signature appears below hereby appoint Charles R. Gordon and David F. Morris as attorneys-in-fact with full power of substitution, severally, to execute in the name and on behalf of the registrant and each such person, individually and in each capacity stated below, one or more amendments to the annual report which amendments may make such changes in the report as the attorney-in-fact acting deems appropriate and to file any such amendment to the report with the Securities and Exchange Commission.

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report has been signed below by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

Signature	Title	Date
/s/ Charles R. Gordon Charles R. Gordon	Principal Executive Officer and Director	March 1, 2019
/s/ David F. Morris David F. Morris	Principal Financial Officer	March 1, 2019
/s/ Kenneth L. Young Kenneth L. Young	Principal Accounting Officer	March 1, 2019
/s/ Stephen P. Cortinovis Stephen P. Cortinovis	Director	March 1, 2019
/s/ Stephanie A. Cuskley Stephanie A. Cuskley	Director	March 1, 2019
/s/ Walter J. Galvin Walter J. Galvin	Director	March 1, 2019
/s/ Rhonda Germany Ballintyn Rhonda Germany Ballintyn	Director	March 1, 2019
/s/ Juanita H. Hinshaw Juanita H. Hinshaw	Director	March 1, 2019
/s/ M. Richard Smith M. Richard Smith	Director	March 1, 2019
/s/ Alfred L. Woods Alfred L. Woods	Director	March 1, 2019

/s/ Phillip D. Wright Phillip D. Wright	Director	March 1, 2019

111

INDEX TO EXHIBITS [1]

3.1	Certificate of Incorporation of the Company (incorporated by reference to Exhibit 2.1 to the current report on Form 8-K12B filed on October 26, 2011), and Certificate of Designation, Preferences and Rights of Series A Junior Participating Preferred Stock (incorporated by reference to Exhibit 3.3 to the current report on Form 8-K12B filed October 26, 2011).
3.2	Certificate of Correction of the Certificate of Incorporation of the Company (incorporated by reference to Exhibit 3.2 to the annual report on Form 10-K for the year ended December 31, 2013).
3.3	Amended and Restated By-Laws of the Company (incorporated by reference to Exhibit 3.1 to the current report on Form 8-K filed August 4, 2015).
10.1	2013 Employee Equity Incentive Plan of the Company (incorporated by reference to Appendix A to the definitive proxy statement on Schedule 14A filed April 4, 2013 in connection with the 2013 annual meeting of stockholders). [2]
10.2	2016 Employee Equity Incentive Plan of the Company (incorporated by reference to Appendix A to the definitive proxy statement on Schedule 14A filed March 11, 2016 in connection with the 2016 annual meeting of stockholders). [2]
10.3	First Amendment to 2016 Employee Equity Incentive Plan of the Company (incorporated by reference to Appendix A to the definitive proxy statement on Schedule 14A filed March 17, 2017 in connection with the 2017 annual meeting of stockholders). [2]
10.4	Second Amendment to 2016 Employee Equity Incentive Plan of the Company (incorporated by reference to Appendix A to the definitive proxy statement on Schedule 14A filed March 16, 2018 in connection with the 2018 annual meeting of stockholders).[2]
10.5	Amended and Restated 2001 Non-Employee Director Equity Incentive Plan of the Company (incorporated by reference to Appendix B to the definitive proxy statement on Schedule 14A filed April 16, 2003 in connection with the 2003 annual meeting of stockholders). [2]
10.6	2006 Non-Employee Director Equity Plan of the Company (incorporated by reference to Appendix B to the definitive proxy statement on Schedule 14A filed March 10, 2006 in connection with the 2006 annual meeting of stockholders). [2]
10.7	2011 Non-Employee Director Equity Plan of the Company (incorporated by reference to Appendix A to the definitive proxy statement on Schedule 14A filed March 18, 2011 in connection with the 2011 annual meeting of stockholders). [2]
10.8	2016 Non-Employee Director Equity Plan of the Company (incorporated by reference to Appendix C to the definitive proxy statement on Schedule 14A filed March 11, 2016 in connection with the 2016 annual meeting of stockholders). [2]
10.9	Employee Stock Purchase Plan of the Company (incorporated by reference to Appendix B to the definitive proxy statement on Schedule 14A filed March 17, 2017 in connection with the 2017 annual meeting of stockholders). [2]

10.10	Voluntary Deferred Compensation Plan, as amended and restated effective January 1, 2018 (incorporated by reference to Exhibit 10.10 to the annual report on Form 10-K for the year ended December 31, 2017). (2)
10.11	2016 Executive Performance Plan of the Company (incorporated by reference to Appendix B to the definitive proxy statement on Schedule 14A filed March 11, 2016 in connection with the 2016 annual meeting of stockholders). (2)

10.12	Form of Directors' Indemnification Agreement (incorporated by reference to Exhibit 10.13 to the annual report on Form 10-K for the year ended December 31, 2011).
10.13	Form of Executive Change in Control Severance Agreement, dated as of October 6, 2014, between Aegion Corporation and each of Charles R. Gordon and David F. Morris (incorporated by reference to Exhibit 10.6 to the current report on Form 8-K filed October 10, 2014). (2)
10.14	Form of First Amendment to Executive Change in Control Severance Agreement, dated May 2, 2016, by and between Aegion Corporation and each of Charles R. Gordon and David F. Morris (incorporated by reference to Exhibit 10.2 to the quarterly report on Form 10-Q for the quarter ended March 31, 2016). (2)
10.15	Severance Policy effective December 21, 2018, filed herewith.(2)
10.16	Form of Change in Control Severance Agreement, dated as of March 1, 2017, between Aegion Corporation and Stephen P. Callahan, Mark A. Menghini and Kenneth L. Young (incorporated by reference to Exhibit 10.15 to the annual report filed on Form 10-K for the year ended December 31, 2016). (2)
10.17	Form of First Amendment to Change in Control Severance Agreement, dated as of October 22, 2018, between Aegion Corporation and Mark A. Menghini (incorporated by reference to Exhibit 10.1 to the quarterly report on Form 10-Q for the quarter ended September 30, 2018).(2)
10.18	Form of First Amendment to Change in Control Severance Agreement, dated as of December 11, 2018, between Aegion Corporation and Stephen P. Callahan, filed herewith.(2)
10.19	Management Annual Incentive Plan, effective January 1, 2019, filed herewith.(2)
10.20	Form of Director Deferred Stock Unit Agreement (for Non-Employee Directors) (incorporated by reference to Exhibit 10.1 to the quarterly report on Form 10-Q for the quarter ended March 31, 2018). (2)
10.21	Form of Performance Unit Agreement, dated February 18, 2019, between Aegion Corporation and certain executive officers of Aegion Corporation, filed herewith.(2)
10.22	Form of Restricted Stock Unit Agreement, dated February 18, 2019, between Aegion Corporation and certain executive officers of Aegion Corporation, filed herewith. (2)
10.23	Letter agreement, dated October 6, 2014, between Aegion Corporation and Charles R. Gordon (incorporated by reference to Exhibit 10.2 to the current report on Form 8-K filed October 10, 2014). (2)
10.24	Form of Inducement Restricted Stock Award Agreement, dated October 8, 2014, between Aegion Corporation and Charles R. Gordon (incorporated by reference to Exhibit 10.5 to the current report on Form 8-K filed October 10, 2014). (2)
10.25	Transition Agreement and Full Release, dated November 18, 2017, between Aegion Corporation and David A. Martin (incorporated by reference to Exhibit 10.1 to the current report on Form 8-K filed November 20, 2017). (2)
10.26	Form of Five-Year Restricted Stock Unit Agreement, dated April 23, 2018, between Aegion Corporation and David F. Morris (incorporated by reference to Exhibit 10.1 to the current report filed on Form 8-K filed April 27, 2018).(2)

10.27	Amended and Restated Credit Agreement, dated October 30, 2015 (incorporated by reference to Exhibit 10.1 to the current report on Form 8-K filed November 2, 2015).
10.28	First Amendment to Credit Agreement, dated November 30, 2017 (incorporated by reference to Exhibit 10.1 to the current report on Form 8-K filed December 6, 2017).

10.29	Second Amendment to Credit Agreement, dated February 27, 2018 (incorporated by reference to Exhibit 10.1 to the current report on Form 8-K filed March 1, 2018).
10.30	Third Amendment to Credit Agreement, dated December 13, 2018 (incorporated by reference to Exhibit 10.1 to the current report on Form 8-K filed December 14, 2018).
21	Subsidiaries of the Company, filed herewith.
23	Consent of PricewaterhouseCoopers LLP, filed herewith.
24	Power of Attorney (set forth on signature page).
31.1	Certification of Charles R. Gordon pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, filed herewith.
31.2	Certification of David F. Morris pursuant to Section 302 of the Sarbanes-Oxley Act of 2002, filed herewith.
32.1	Certification of Charles R. Gordon pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, filed herewith.
32.2	Certification of David F. Morris pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, filed herewith.
95	Mine Safety Disclosure, filed herewith.
101.INS	XBRL Instance Document*
101.SCH	XBRL Taxonomy Extension Schema Document*
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document*
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document*
101.LAB	XBRL Taxonomy Extension Label Linkbase Document*
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document*

* In accordance with Rule 406T under Regulation S-T, the XBRL-related information in Exhibit 101 shall be deemed “furnished” and not “filed”.

(1) The Company’s current, quarterly and annual reports are filed with the Securities and Exchange Commission under file no. 001-35328.
(2) Management contract or compensatory plan or arrangement.

*   *   *

Documents listed in this Index to Exhibits will be made available upon written request.

114