UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM 10-Q

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

For the quarterly period ended March 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 000-14656

REPLIGEN CORPORATION
(Exact name of registrant as specified in its charter)

Delaware	**04-2729386**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**
41 Seyon Street, Bldg. 1, Suite 100 Waltham, MA	**02453**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (781) 250-0111

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

Indicate by check mark whether the registrant has submitted electronically and posted on its corporate website, if any, every Interactive Data File required to be submitted and posted 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 and post such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a 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. (Check one):

Large accelerated filer	☒	Accelerated filer	☐
Non-accelerated filer	☐ (Do not check if a smaller reporting company)	Smaller reporting company	☐
		Emerging growth company	☐

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

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 the number of shares outstanding of each of the issuer's classes of common stock, as of May 1, 2018.

Class	Number of Shares
Common Stock, par value $.01 per share	**43,693,913**

Table of Contents

REPLIGEN CORPORATION

CONDENSED CONSOLIDATED BALANCE SHEETS
(Unaudited)

(in thousands, except share data)	March 31, 2018	December 31, 2017
Assets		
Current assets:		
Cash and cash equivalents	$ 173,876	$ 173,759
Accounts receivable, less reserve for doubtful accounts of $59 at March 31, 2018 and $58 at December 31, 2017, respectively	29,352	27,585
Royalties and other receivables	31	153
Inventories, net	40,124	39,004
Prepaid expenses and other current assets	4,939	2,281
Total current assets	248,322	242,782
Property, plant and equipment, net	22,674	22,417
Intangible assets, net	142,273	144,753
Goodwill	327,989	327,333
Other assets	1,990	6,234
Total assets	$ 743,248	$ 743,519
Liabilities and stockholders' equity		
Current liabilities:		
Accounts payable	$ 6,200	$ 7,282
Accrued liabilities	14,121	17,929
Total current liabilities	20,321	25,211
Convertible senior notes, net	100,276	99,250
Deferred tax liabilities	20,858	25,167
Other long-term liabilities	4,610	2,343
Commitments and contingencies (Note 14)		
Stockholders' equity:		
Preferred stock, $.01 par value, 5,000,000 shares authorized, no shares issued or outstanding	—	—
Common stock, $.01 par value, 80,000,000 shares authorized, 43,692,303 shares at March 31, 2018 and 43,587,079 shares at December 31, 2017 issued and outstanding	437	436
Additional paid-in capital	631,595	628,983
Accumulated other comprehensive loss	(6,112)	(6,363)
Accumulated deficit	(28,737)	(31,508)
Total stockholders' equity	597,183	591,548
Total liabilities and stockholders' equity	$ 743,248	$ 743,519

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

REPLIGEN CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(Unaudited)

(in thousands, except share and per share data)	Three months ended March 31, 2018	2017
Revenue:		
Product revenue	$ 44,799	$ 30,569
Royalty and other revenue	31	21
Total revenue	44,830	30,590
Operating expenses:		
Cost of product revenue	19,668	13,990
Research and development	3,288	1,742
Selling, general and administrative	15,898	9,182
Total operating expenses	38,854	24,914
Income from operations	5,976	5,676
Investment income	181	96
Interest expense	(1,652)	(1,585)
Other income (expense)	71	(120)
Income before income taxes	4,576	4,067
Income tax provision	1,128	999
Net income	$ 3,448	$ 3,068
Earnings per share:		
Basic	$ 0.08	$ 0.09
Diluted	$ 0.08	$ 0.09
Weighted average shares outstanding:		
Basic	43,621,270	33,891,702
Diluted	44,326,732	34,382,322
Other comprehensive income:		
Unrealized gain on investments	—	4
Foreign currency translation gain	251	1,027
Comprehensive income	$ 3,699	$ 4,099

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

REPLIGEN CORPORATION

CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(Unaudited)

(In thousands)	Three months ended March 31, 2018	2017
Cash flows from operating activities:		
Net income	$ 3,448	$ 3,068
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation and amortization	3,960	1,582
Non-cash interest expense	1,036	970
Stock-based compensation expense	2,268	1,531
Deferred tax expense	449	10
Loss on conversion of senior convertible notes	1	—
Loss on disposal of assets	—	59
Changes in assets and liabilities:		
Accounts receivable	(1,529)	(2,415)
Other receivables	127	172
Inventories	(1,188)	851
Prepaid expenses and other current assets	(1,608)	34
Accounts payable	(1,550)	(452)
Accrued liabilities	(3,839)	(4,220)
Long-term liabilities	(3)	(43)
Net cash provided by operating activities	1,572	1,147
Cash flows from investing activities:		
Purchases of marketable securities	—	(28)
Redemptions of marketable securities	—	7,400
Purchases of property, plant and equipment	(1,564)	(1,295)
Net cash (used in) provided by investing activities	(1,564)	6,077
Cash flows from financing activities:		
Exercise of stock options	344	1,333
Repayment of senior convertible notes	(11)	—
Payment of contingent consideration	—	(1,663)
Net cash provided by (used in) financing activities	333	(330)
Effect of exchange rate changes on cash and cash equivalents	(224)	536
Net increase (decrease) in cash and cash equivalents	117	7,430
Cash, cash equivalents and restricted cash, beginning of period	173,759	122,683
Cash, cash equivalents and restricted cash, end of period	$ 173,876	$ 130,113
Supplemental disclosure of non-cash activities:		
Income taxes paid	$ 937	$ 1,181
Non-cash effect of adoption of ASU 2016-16	$ 5,609	$ —
Payment of contingent consideration in common stock	$ —	$ 1,062

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

REPLIGEN CORPORATION

NOTES TO CONDENSED CONSOLIDATED FINANCIAL STATEMENTS
(Unaudited)

1. Basis of Presentation

The condensed consolidated financial statements included herein have been prepared by Repligen Corporation (the "Company," "Repligen" or "we") in accordance with generally accepted accounting principles in the United States ("U.S. GAAP") and pursuant to the rules and regulations of the Securities and Exchange Commission ("SEC"), for Quarterly Reports on Form 10-Q and Article 10 of Regulation S-X and do not include all of the information and footnote disclosures required by U.S. GAAP. These condensed consolidated financial statements should be read in conjunction with the audited consolidated financial statements and accompanying notes thereto included in the Company's Annual Report on Form 10-K for the fiscal year ended December 31, 2017.

The preparation of financial statements in conformity with U.S. GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

The condensed consolidated financial statements include the accounts of the Company and its wholly-owned subsidiaries, Repligen Sweden AB ("Repligen Sweden"), Repligen GmbH, Repligen Singapore Pte. Ltd., our former subsidiary, TangenX Technology Corporation ("TangenX," acquired on December 14, 2016 and merged into the Company as of June 30, 2017) and Spectrum LifeSciences, LLC ("Spectrum," acquired on August 1, 2017). All significant intercompany accounts and transactions have been eliminated in consolidation.

In the opinion of management, the accompanying unaudited condensed consolidated financial statements include all adjustments, consisting of only normal, recurring adjustments necessary for a fair presentation of the financial position, results of operations and cash flows. The results of operations for the interim periods presented are not necessarily indicative of results to be expected for the entire year.

Recently Issued Accounting Pronouncements

In May 2014, the FASB issued ASU No. 2014-09, "Revenue from Contracts with Customers (Topic 606)," ("ASC 606") which supersedes the revenue recognition requirements in Accounting Standards Codification Topic 605, *Revenue Recognition* , and creates a new Topic 606, *Revenue from Contracts with Customers* . Two adoption methods are permitted: retrospectively to all prior reporting periods presented, with certain practical expedients permitted; or retrospectively with the cumulative effect of initially adopting the ASU recognized at the date of initial application. The adoption of this ASU included updates as provided under ASU 2015-14, "Revenue from Contracts with Customers (Topic 606): Deferral of the Effective Date"; ASU 2016-08, "Revenue from Contracts with Customers (Topic 606): Principal versus Agent Considerations (Reporting Revenue Gross versus Net)"; ASU 2016-10, "Revenue from Contracts with Customers (Topic 606): Identifying Performance Obligations and Licensing"; and ASU 2016-12, "Revenue from Contracts with Customers (Topic 606): Narrow-Scope Improvements and Practical Expedients." The Company adopted the provisions of ASC 606 using the modified retrospective method effective January 1, 2018. See Note 3 for further discussion of the effects of this standard on the Company's consolidated financial statements.

In January 2016, the FASB issued ASU No. 2016-01, "Financial Instruments—Overall (Subtopic 825-10): Recognition and Measurement of Financial Assets and Financial Liabilities." This guidance changes how entities measure equity investments that do not result in consolidation and are not accounted for under the equity method. Entities will be required to measure these investments at fair value at the end of each reporting period and recognize changes in fair value in net income. A practicability exception will be available for equity investments that do not have readily determinable fair values; however, the exception requires the Company to consider relevant transactions that can be reasonably known to identify any observable price changes that would impact the fair value. This guidance also changes certain disclosure requirements and other aspects of current U.S. GAAP. The Company adopted this guidance in the first quarter of 2018. Because the Company does not hold any equity securities as of December 31, 2017 and March 31, 2018, adoption of this standard did not have any impact on its consolidated financial statements.

In February 2016, the FASB issued ASU No. 2016-02, "Leases (Topic 842)" ("ASU 2016-02"). ASU 2016-02 requires lessees to recognize a right-of-use asset and a lease liability for most leases. Extensive quantitative and qualitative disclosures, including significant judgments made by management, will be required to provide greater insight into the extent of revenue and expense recognized and expected to be recognized from existing contracts. The accounting applied by a lessor is largely unchanged from that applied under the current standard. The standard must be adopted using a modified retrospective transition approach and provides for certain practical expedients. This ASU is effective for public entities for fiscal years beginning after December 15, 2018, with early adoption permitted. The Company has not assessed the impact of the new standard on its consolidated financial statements, but does expect this new standard to have a material impact on the Company's consolidated balance sheet.

In August 2016, the FASB issued ASU No. 2016-15, "Statement of Cash Flows (Topic 203): Classification of Certain Cash Receipts and Cash Payments". ASU No. 2016-15 addresses eight specific cash flow issues and clarifies their presentation and classification in the Statement of Cash Flows. This ASU is effective for fiscal years beginning after December 15, 2017 and is to be applied retrospectively with early adoption permitted. The Company has historically classified payments up to the amount of its contingent consideration liability recognized at the date of its acquisition as financing activities, with additional payments classified as operating activities. Because the Company has classified its contingent consideration payments as required by this standard, the adoption of this standard did not have any impact on its consolidated financial statements when applied on a retrospective basis.

In October 2016, the FASB issued ASU 2016-16, "Intra-Entity Transfers of Assets Other Than Inventory." ASU 2016-16 requires that the income tax consequences of an intra-entity asset transfer other than inventory are recognized at the time of the transfer. An entity will continue to recognize the income tax consequences of an intercompany transfer of inventory when the inventory is sold to a third party. The Company adopted this standard on a modified-retrospective basis on January 1, 2018. See Note 12 for a discussion of the impact of this ASU on the Company's financial statements.

In November 2016, the FASB issued ASU No. 2016-18, "Statement of Cash Flows (Topic 230): Restricted Cash," which requires that the statement of cash flows explain the change during the period in the total cash, which is inclusive of cash and cash equivalents and amounts generally described as restricted cash or restricted cash equivalents. Restricted cash and restricted cash equivalents will be included with cash and cash equivalents when reconciling the beginning of period and end of period balances on the statement of cash flows upon adoption of this standard. The Company adopted this standard on a retrospective basis on January 1, 2018. The adoption resulted in an increase to cash, cash equivalents and restricted cash of $450,000 in the statement of cash flows at December 31, 2016 and March 31, 2017. The Company did not hold any restricted cash at December 31, 2017 or March 31, 2018.

In January 2017, the FASB issued ASU No. 2017-01, "Business Combinations (Topic 805): Clarifying the Definition of a Business", which clarifies the definition of a business to assist entities with evaluating whether transactions should be accounted for as acquisitions (or disposals) of assets or businesses. The Company adopted this standard as of January 1, 2018, and the adoption of ASU 2017-01 did not have a material impact on the Company's consolidated financial statements.

In January 2017, the FASB issued ASU No. 2017-04, "Intangibles–Goodwill and Other (Topic 350): Simplifying the Test for Goodwill Impairment," eliminating the requirement to calculate the implied fair value, essentially eliminating step two from the goodwill impairment test. ASU No. 2017-04 requires goodwill impairment to be based upon the results of step one of the impairment test, which is defined as the excess of the carrying value of a reporting unit over its fair value. The impairment charge will be limited to the amount of goodwill allocated to that reporting unit. The standard is effective for the Company on a prospective basis beginning on January 1, 2020, with early adoption permitted. The Company adopted this standard as of January 1, 2018, and the adoption of this standard did not have a material impact on the Company's consolidated financial statements.

2. Acquisition of Spectrum LifeSciences, LLC

On August 1, 2017, the Company completed the acquisition of Spectrum pursuant to the terms of an Agreement and Plan of Merger and Reorganization, dated as of June 22, 2017 (such acquisition, the "Spectrum Acquisition").

Spectrum is a diversified filtration company with a differentiated portfolio of hollow fiber cartridges, bench-top to commercial scale filtration and perfusion systems and a broad portfolio of disposable and single-use solutions. Spectrum's products are primarily used for the filtration, isolation, purification and concentration of monoclonal antibodies, vaccines, recombinant proteins, diagnostic products and cell therapies where the company offers both standard and customized solutions to its bioprocessing customers.

Spectrum's filtration products include its KrosFlo ® line of hollow-fiber cartridges, tangential flow filtration (TFF) systems and single-use flow path consumables, as well as its Spectra/Por ® portfolio of laboratory dialysis products and its Pro-Connex ® single-use hollow fiber Module-Bag-Tubing (MBT) sets. Outside of filtration, Spectrum sells its Spectra/Chrom ® liquid chromatography products for research applications. These bioprocessing products account for the majority of Spectrum revenues. Spectrum also offers a line of operating room products.

Consideration Transferred

The Company accounted for the Spectrum Acquisition as a purchase of a business under ASC 805, "Business Combinations." The Spectrum Acquisition was funded through payment of approximately $122.9 million in cash, 6,153,995 unregistered shares of the Company's common stock totaling $247.6 million and a working capital adjustment of $425,000 for a total purchase price of $370.9 million. Under the acquisition method of accounting, the assets of Spectrum were recorded as of the acquisition date, at their respective fair values, and consolidated with those of the Company. The fair value of the net assets acquired was approximately $370.9 million.

The estimated consideration and preliminary purchase price information has been prepared using a valuation that required the use of significant assumptions and estimates in its preparation. Critical estimates included, but were not limited to, future expected cash flows, including projected revenues and expenses, and the applicable discount rates. These estimates were based on assumptions that the Company believes to be reasonable; however, actual results may differ from these estimates.

The total consideration transferred follows (in thousands):

Cash consideration	$122,932
Equity consideration	247,575
Working capital adjustment	425
Net assets acquired	$370,932

Acquisition-related costs are not included as a component of consideration transferred, but are expensed in the periods in which the costs are incurred. The Company has incurred $655,000 in costs related to the Spectrum Acquisition for the three-month period ended March 31, 2018 and $7,060,000 in costs for the year ended December 31, 2017. These costs are primarily included in selling, general and administrative expenses in the consolidated statements of operations.

Fair Value of Net Assets Acquired

The allocation of purchase price was based on the fair value of assets acquired and liabilities assumed as of August 1, 2017, based on the preliminary valuation. The components and allocation of the purchase price consists of the following amounts (in thousands):

Cash and cash equivalents	$ 10,137
Accounts receivable	5,075
Inventory	13,570
Prepaid expenses and other assets	616
Fixed assets	6,004
Deferred tax assets	1,102
Customer relationships	78,400
Developed technology	38,560
Trademark and tradename	2,160
Non-competition agreements	960
Goodwill	265,654
Accounts payable	(1,335)
Unrecognized tax benefit	(576)
Accrued liabilities	(5,787)
Deferred tax liabilities	(43,608)
Fair value of net assets acquired	$370,932

Of the consideration paid, $78.4 million represents the fair value of customer relationships that is amortized over the weighted average determined useful life of 15 years, and $38.6 million represents the fair value of developed technology that is amortized over a determined useful life of 20 years. $960,000 represents the fair value of non-competition agreements that are amortized over a determined life of 3 years. $2.2 million represents the fair value of trademarks and trade names that are determined to have an indefinite useful life. The aforementioned intangible assets are amortized on a straight-line basis.

The goodwill of $265.7 million represents future economic benefits expected to arise from synergies from combining operations and commercial organizations to increase market presence and the extension of existing customer relationships. None of the goodwill recorded is expected to be deductible for income tax purposes.

The purchase price allocation may be subject to adjustment as purchase accounting is preliminary as of March 31, 2018 related to inventory valuation. The final allocation may include, but not be limited to, changes in allocations to inventory and goodwill.

Revenue, Net Income and Pro Forma Presentation

The Company recorded revenue from Spectrum of $11,719,000 for the three-month period ended March 31, 2018. The Company has included the operating results of Spectrum in its consolidated statements of operations since the August 1, 2017 acquisition date. The following table presents unaudited supplemental pro forma information as if the Spectrum Acquisition had occurred as of January 1, 2017 (in thousands, except per share data):

	Pro-forma Three months ended March 31, 2018	Pro-forma Three months ended March 31, 2017
Total revenue	44,830	39,875
Net income	3,939	3,266
Earnings per share:		
Basic	$ 0.09	$ 0.08
Diluted	$ 0.09	$ 0.08

The unaudited pro forma information for the three-month period ended March 31, 2018 was calculated after applying the Company's accounting policies and the impact of acquisition date fair value adjustments. The unaudited pro forma net income for the three-month period ended March 31, 2018 was adjusted to exclude acquisition-related transaction costs, as these expenses would have been incurred in the prior year assuming the Spectrum Acquisition closed on January 1, 2017.

These pro forma condensed consolidated financial results include certain adjustments to reflect the pro forma results of operations as if the acquisition had occurred as of January 1, 2017. The pro forma information does not reflect the effect of costs or synergies that would have been expected to result from the integration of the acquisition. The pro forma information does not purport to be indicative of the results of operations that actually would have resulted had the combinations occurred at the beginning of the period presented, or of future results of the consolidated entities.

3. Revenue Recognition

Adoption of ASC Topic 606, Revenue from Contracts with Customers

The Company adopted ASC 606 on January 1, 2018, using the modified retrospective method for all contracts not completed as of the date of adoption. For contracts that were modified before the effective date, the Company reflected the aggregate effect of all modifications when identifying performance obligations and allocating transaction price in accordance with the practical expedient in paragraph ASC 606-10-65-1-(f)-4, which did not have a material effect on the cumulative impact of adopting ASC 606. Results for reporting periods beginning January 1, 2018 are presented under ASC 606, while prior period amounts are not adjusted and continue to be reported under the accounting standards in effect for the prior period. The impact to the Company's consolidated financial statements as a result of applying ASC 606 was immaterial. Deferred revenue resulting from contracts with customers is included in accrued expenses on the Company's consolidated balance sheet.

Revenue Recognition

Revenue is recognized when, or as, obligations under the terms of a contract are satisfied, which occurs when control of the promised products or services is transferred to customers. Revenue is measured as the amount of consideration the Company expects to receive in exchange for transferring products or services to a customer ("transaction price"). To the extent the transaction price includes variable consideration, the Company estimates the amount of variable consideration that should be included in the transaction price utilizing the expected value method or the most likely amount method, depending on the facts and circumstances relative to the contract. Variable consideration is included in the transaction price if, in the Company's judgment, it is probable that a significant future reversal of cumulative revenue under the contract will not occur. Estimates of variable consideration and determination of whether to include estimated amounts in the transaction price are based largely on an assessment of the Company's anticipated performance and all information (historical, current and forecasted) that is reasonably available. Sales, value add, and other taxes collected on behalf of third parties are excluded from revenue.

When determining the transaction price of a contract, an adjustment is made if payment from a customer occurs either significantly before or significantly after performance, resulting in a significant financing component. Applying the practical expedient in paragraph 606-10-32-18, the Company does not assess whether a significant financing component exists if the period between when the Company performs its obligations under the contract and when the customer pays is one year or less. None of the Company's contracts contained a significant financing component as of March 31, 2018.

Contracts with customers may contain multiple performance obligations. For such arrangements, the transaction price is allocated to each performance obligation based on the estimated relative standalone selling prices of the promised products or services underlying each performance obligation. The Company determines standalone selling prices based on the price at which the performance obligation is sold separately. If the standalone selling price is not observable through past transactions, the Company estimates the standalone selling price taking into account available information such as market conditions and internally approved pricing guidelines related to the performance obligations.

The Company recognizes product revenue under the terms of each customer agreement upon transfer of control to the customer, which occurs at a point in time.

Disaggregation of Revenue

Revenues for the three-month periods ended March 31, 2018 and 2017 were as follows:

	Three months ended March 31,			
(in thousands, except percentages)	**2018**	**2017**	**$ Change**	**% Change**
Product revenue	$44,799	$30,569	$14,230	47%
Royalty and other revenue	31	21	10	48%
Total revenue	$44,830	$30,590	$14,240	47%

When disaggregating revenue, the Company considered all of the economic factors that may affect its revenues. Because all of its revenues are from bioprocessing customers, there are no differences in the nature, timing and uncertainty of the Company's revenues and cash flows from any of its product lines. However, given that the Company's revenues are generated in different geographic regions, factors such as regulatory and geopolitical factors within those regions could impact the nature, timing and uncertainty of the Company's revenues and cash flows. In addition, a significant portion of the Company's revenues are generated from two customers; therefore, economic factors specific to these two customers could impact the nature, timing and uncertainty of the Company's revenues and cash flows.

The following tables disaggregate the Company's revenue from contracts with customers by geographic region (in thousands).

	Three months ended March 31, 2018
North America	$ 20,239
Europe	19,401
Asia and Pacific	4,947
Other	243
Total revenue	$ 44,830

Revenue from significant customers is as follows (in thousands):

	Three months ended March 31, 2018
GE Healthcare	$ 7,717
MilliporeSigma	$ 6,465

Protein Products

The Company's protein product line generates revenue through the sale of Protein A ligands, an essential component of Protein A chromatography resins (media) used in the purification of virtually all mAb-based drugs on the market or in development. The Company manufactures multiple forms of Protein A ligands under long term supply agreements with major life sciences companies, who in turn sell their Protein A chromatography media to end users (biopharmaceutical manufacturers). Each protein product is considered distinct and therefore represents a separate performance obligation. Protein product revenue is generally recognized at a point in time upon transfer of control to the customer.

Filtration Products

The Company's filtration product line generates revenue through the sale of KrosFlo ® hollow-fiber (HF) tangential flow filtration (TFF) membranes and modules, ProConnex ® single-use flow path connectors, flat sheet TFF cassettes and hardware, and XCell™ alternating tangential flow (ATF) devices and related consumables.

The Company markets the KrosFlo line of HF cartridges and TFF systems and the ProConnex line of single-use flow path connectors which were acquired as part of the acquisition of Spectrum in August 2017. These products are used in the filtration, isolation, purification and concentration of biologics and diagnostic products. Sales of large-scale systems generally include components and consumables as well as training and installation services at the request of the customer. Because the initial sale of components and consumables are necessary for the operation of the system, such items are combined with the systems as a single performance obligation. Training and installation services do not significantly modify or customize these systems and therefore represent a distinct performance obligation. Each of the Company's other product offerings are not highly interdependent of one another and are therefore considered distinct products that represent separate performance obligations. Revenue on these products is generally recognized at a point in time upon transfer of control to the customer. The Company invoices the customer for the installation and training services in an amount that directly corresponds with the value to the customer of the Company's performance to date; therefore, revenue recognized is based on the amount billable to the customer in accordance with the practical expedient under ASC 606-10-55-18.

The Company also markets flat sheet TFF cassettes and hardware, which were acquired as part of the acquisition of TangenX Technology in December 2016. TFF is a rapid and efficient method for separation and purification of biomolecules that is widely used in laboratory, process development and process scale applications in biopharmaceutical manufacturing. The Company's single-use TFF (Sius™ TFF) cassettes and hardware are not highly interdependent of one another and are therefore considered distinct products that represent separate performance obligations. Sius TFF product revenue is generally recognized at a point in time upon transfer of control to the customer.

The Company also markets the XCell™ ATF System, a technologically advanced filtration device used in upstream processes to continuously remove cellular metabolic waste products during the course of a fermentation run, freeing healthy cells to continue producing the biologic drug of interest. ATF Systems typically include a filtration system and consumables (i.e., tube devices, metal stands) as well as training and installation services at the request of the customer. The filtration system and consumables are considered distinct products and therefore represent separate performance obligations. First time purchasers of the systems typically purchase a controller that is shipped with the tube device(s) and metal stand(s). The controller is not considered distinct as it is a proprietary product that is highly interdependent with the filtration system; therefore, the controller is combined with the filtration system and accounted for as a single performance obligation. The training and installation services do not significantly modify or customize the ATF system and therefore represent a distinct performance obligation. ATF system product revenue related to the filtration system (including the controller if applicable) and consumables is generally recognized at a point in time upon transfer of control to the customer. ATF system service revenue related to training and installation services is generally recognized over time, as the customer simultaneously receives and consumes the benefits as the Company performs. The Company invoices the customer for the installation and training services in an amount that directly corresponds with the value to the customer of the Company's performance to date; therefore, revenue recognized is based on the amount billable to the customer in accordance with the practical expedient under ASC 606-10-55-18.

Chromatography Products

The Company's chromatography product line includes a number of products used in the downstream purification and quality control of biological drugs. The majority of chromatography revenue relates to the OPUS pre-packed chromatography (PPC) column line and Protein A chromatography resins. OPUS columns typically consist of the outer hardware of the column with a resin as ordered by the customer packed inside of the column. OPUS columns may also be ordered without the packed resin. In either scenario, the OPUS column and resin are not interdependent of one another and are therefore considered distinct products that represent separate performance obligations. Chromatography product revenue is generally recognized at a point in time upon transfer of control to the customer.

Other Products

The Company's other products include ELISA test kits used by quality control departments to detect and measure the presence of leached Protein A and/or growth factor in the final product. Each ELISA kit is considered distinct and therefore represents a separate performance obligation. Other product revenue is generally recognized at a point in time upon transfer of control to the customer.

Transaction Price Allocated to Future Performance Obligations

Remaining performance obligations represents the transaction price of contracts for which work has not been performed or has been partially performed. The Company's future performance obligations relate primarily to the installation and training of certain of its systems sold to customers. These performance obligations are completed within one year of receipt of a purchase order from its customers. Accordingly, the Company has elected to not disclose the value of these unsatisfied performance obligations as provided under ASC 606-10-50-14.

Contract Balances from Contracts with Customers

The following table provides information about receivables and deferred revenue from contracts with customers as of March 31, 2018:

	2018
Balances from contracts with customers only:	
Accounts receivable	$29,352
Deferred revenue	1,547
Revenue recognized in the period relating to:	
The beginning deferred revenue balance	$ 434
Changes in pricing related to products or services satisfied in previous periods	—
Impairment losses on receivables	—

The timing of revenue recognition, billings and cash collections results in accounts receivables and deferred revenue on the Company's consolidated balance sheets.

A contract asset is created when the Company satisfies a performance obligation by transferring a promised good to the customer. Contract assets may represent conditional or unconditional rights to consideration. The right is conditional, and recorded as a contract asset, if the Company must first satisfy another performance obligation in the contract before it is entitled to payment from the customer. Contract assets are transferred to billed receivables once the right becomes unconditional. If the Company has the unconditional right to receive consideration from the customer, the contract asset is accounted for as a billed receivable and presented separately from other contract assets. A right is unconditional if nothing other than the passage of time is required before payment of that consideration is due.

When consideration is received, or such consideration is unconditionally due, from a customer prior to transferring goods or services to the customer under the terms of a contract, a contract liability is recorded. Contract liabilities are recognized as revenue after control of the products or services is transferred to the customer and all revenue recognition criteria have been met.

Costs to Obtain or Fulfill a Customer Contract

The Company's sales commission structure is based on achieving revenue targets. The commissions are driven by revenue derived from customer purchase orders which are short term in nature.

Applying the practical expedient in paragraph 340-40-25-4, the Company recognizes the incremental costs of obtaining contracts as an expense when incurred if the amortization period of the assets that the Company otherwise would have recognized is one year or less. These costs are included in selling, general, and administrative expenses. When shipping and handling costs are incurred after a customer obtains control of the products, the Company accounts for these as costs to fulfill the promise and not as a separate performance obligation.

4. Accumulated Other Comprehensive Income

The following table summarizes the changes in accumulated other comprehensive income by component (in thousands):

(In thousands)	Foreign currency translation gain (loss)
Balance at December 31, 2017	$ (6,363)
Foreign currency translation gain	251
Balance at March 31, 2018	$ (6,112)

5. Earnings Per Share

The Company reports earnings per share in accordance with ASC Topic 260, "Earnings Per Share," which establishes standards for computing and presenting earnings per share. Basic earnings per share is computed by dividing net income available to common shareholders by the weighted-average number of common shares outstanding during the period. Diluted earnings per share is computed by dividing net income available to common shareholders by the weighted-average number of common shares and dilutive common share equivalents then outstanding. Potential common share equivalents consist of restricted stock awards and the incremental common shares issuable upon the exercise of stock options. Under the treasury stock method, unexercised "in-the-money" stock options and warrants are assumed to be exercised at the beginning of the period or at issuance, if later. The assumed proceeds are then used to purchase common shares at the average market price during the period. Share-based payment awards that entitle their holders to receive non-forfeitable dividends before vesting are considered participating securities and are considered in the calculation of basic and diluted earnings per share. There were no such participating securities outstanding during the three-month periods ended March 31, 2018 and 2017.

Basic and diluted weighted average shares outstanding were as follows:

	Three months ended March 31,	
	2018	2017
Basic weighted average common shares outstanding	43,621,270	33,891,702
Effect of dilutive securities:		
Stock options and restricted stock awards	389,702	490,620
Convertible senior notes	315,760	—
Weighted average common shares, assuming dilution	44,326,732	34,382,322

At March 31, 2018, there were outstanding options to purchase 1,109,353 shares of the Company's common stock at a weighted average exercise price of $25.34 per share and 703,076 restricted stock units. For the three months ended March 31, 2018, 593,874 options to purchase shares of the Company's common stock were excluded from the calculation of diluted earnings per share because the exercise prices of the stock options were greater than or equal to the average price of the common shares, and were therefore anti-dilutive.

At March 31, 2017, there were outstanding options to purchase 805,903 shares of the Company's common stock at a weighted average exercise price of $19.68 per share and 404,781 restricted stock units. For the three months ended March 31, 2017, 458,685 options to purchase shares of the Company's common stock were excluded from the calculation of diluted earnings per share because the exercise prices of the stock options were greater than or equal to the average price of the common shares, and were therefore anti-dilutive.

As provided by the terms of the indenture underlying the Company's 2.125% Convertible Senior Notes due 2021 (the "Notes"), the Company has a choice to settle the conversion obligation for the Notes in cash, shares or any combination of the two. The Company currently intends to settle the par value of the Notes in cash and any excess conversion premium in shares. The Company applies the provisions of ASC 260, *Earnings Per Share,* Subsection 10-45-44, to determine the diluted weighted average shares outstanding as it relates to the conversion spread on its convertible notes. Accordingly, the par value of the Notes will not be included in the calculation of diluted income per share, but the dilutive effect of the conversion premium will be considered in the calculation of diluted net income per share using the treasury stock method. The dilutive impact of the Company's convertible notes is based on the difference between the Company's current period average stock price and the conversion price of the convertible notes, provided there is a premium. Pursuant to this accounting standard, there is no dilution from the accreted principal of the Notes as of March 31, 2018 and March 31, 2017.

6. Inventories

Inventories relate to the Company's bioprocessing business. The Company values inventory at cost or, if lower, market value, using the first-in, first-out method. The Company reviews its inventories at least quarterly and records a provision for excess and obsolete inventory based on its estimates of expected sales volume, production capacity and expiration dates of raw materials, work-in-process and finished products. Expected sales volumes are determined based on supply forecasts provided by key customers for the next 3 to 12 months. The Company writes down inventory that has become obsolete, inventory that has a cost basis in excess of its expected net realizable value, and inventory in excess of expected requirements to cost of product revenue. Manufacturing of bioprocessing finished goods is done to order and tested for quality specifications prior to shipment.

A change in the estimated timing or amount of demand for the Company's products could result in additional provisions for excess inventory quantities on hand. Any significant unanticipated changes in demand or unexpected quality failures could have a significant impact on the value of inventory and reported operating results. During all periods presented in the accompanying financial statements, there have been no material adjustments related to a revised estimate of inventory valuations.

Work-in-process and finished products inventories consist of material, labor, outside processing costs and manufacturing overhead. Inventories consist of the following (in thousands):

	March 31, 2018	December 31, 2017
Raw Materials	$ 21,826	$ 22,351
Work-in-process	3,828	4,083
Finished products	14,470	12,570
Total	$ 40,124	$ 39,004

7. Property, Plant and Equipment

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

	March 31, 2018	December 31, 2017
Land	$ 1,023	$ 1,023
Buildings	764	764
Leasehold improvements	15,740	15,673
Equipment	22,497	21,904
Furniture and fixtures	4,605	4,272
Construction in progress	3,052	2,581
Total property, plant and equipment	47,681	46,217
Less: accumulated depreciation	(25,007)	(23,800)
Property, plant and equipment, net	$ 22,674	$ 22,417

Depreciation expense totaled approximately $1,284,000 and $928,000 for the three-month periods ended March 31, 2018 and 2017, respectively.

8. Intangible Assets

Intangible assets are amortized over their useful lives using the straight-line method, as applicable, and the amortization expense is recorded within selling, general and administrative expense in the Company's statements of comprehensive income.

The Company reviews its indefinite-lived intangible assets not subject to amortization to determine if adverse conditions exist or a change in circumstances exists that would indicate an impairment. Intangible assets and their related useful lives are reviewed at least annually to determine if any adverse conditions exist that would indicate the carrying value of these assets may not be recoverable. More frequent impairment assessments are conducted if certain conditions exist, including a change in the competitive landscape, any internal decisions to pursue new or different technology strategies, a loss of a significant customer, or a significant change in the marketplace, including changes in the prices paid for our products or changes in the size of the market for our products. An impairment results if the carrying value of the asset exceeds the estimated fair value of the asset. If the estimate of an intangible asset's remaining useful life is changed, the remaining carrying amount of the intangible asset is amortized prospectively over the revised remaining useful life. The Company continues to believe that its intangible assets are recoverable at March 31, 2018.

Intangible assets consisted of the following at March 31, 2018 (in thousands):

	Gross Carrying Amount	Accumulated Amortization	Weighted Average Useful Life (in years)
Technology – developed	$ 51,860	$ (3,898)	19
Patents	240	(240)	8
Customer relationships	102,210	(11,446)	14
Trademark – definite lived	2,160	(75)	20
Trademark – indefinite lived	700	—	—
Other intangibles	1,066	(304)	3
Total intangible assets	$ 158,236	$ (15,963)	16

Intangible assets consisted of the following at December 31, 2017 (in thousands):

	Gross Carrying Amount	Accumulated Amortization	Weighted Average Useful Life (in years)
Technology – developed	$ 51,801	$ (3,201)	19
Patents	240	(238)	8
Customer relationships	102,120	(9,636)	14
Trademarks – definite lived	2,160	(47)	20
Trademarks – indefinite lived	700	—	—
Other intangibles	1,063	(209)	3
Total intangible assets	$ 158,084	$ (13,331)	16

Amortization expense for amortized intangible assets was approximately $2,664,000 and $715,000 for the three-month periods ended March 31, 2018 and 2017, respectively. As of March 31, 2018, the Company expects to record amortization expense as follows (in thousands):

Years Ending	Amortization Expense
December 31, 2018 (nine months remaining)	$ 7,978
December 31, 2019	10,513
December 31, 2020	9,910
December 31, 2021	9,395
December 31, 2022	9,395

9. Accrued Liabilities

Accrued liabilities consist of the following (in thousands):

	March 31, 2018	December 31, 2017
Employee compensation	$ 5,246	$ 9,560
Taxes	2,049	1,668
Royalty and license fees	1,243	1,383
Accrued purchases	521	1,191
Professional fees	827	947
Unearned revenue	1,547	960
Other accrued expenses	2,688	2,220
Total	$ 14,121	$ 17,929

10. Convertible Senior Notes

The carrying value of the Company's convertible senior notes is as follows:

	March 31, 2018	December 31, 2017
2.125% Convertible Senior Notes due 2021:		
Principal amount	$ 114,989	$ 115,000
Unamortized debt discount	(12,513)	(13,395)
Unamortized debt issuance costs	(2,200)	(2,355)
Total convertible senior notes	$ 100,276	$ 99,250

On May 24, 2016, the Company issued $115 million aggregate principal amount of its Notes. The net proceeds from the sale of the Notes, after deducting the underwriting discounts and commissions and other related offering expenses, were approximately $111.1 million. The Notes bear interest at the rate of 2.125% per annum, payable semiannually in arrears on June 1 and December 1 of each year, beginning December 1, 2016.

The Notes will mature on June 1, 2021, unless earlier repurchased, redeemed or converted in accordance with their terms. Prior to March 1, 2021, the Notes will be convertible at the option of holders of the Notes only upon satisfaction of certain conditions and during certain periods, and thereafter, the notes will be convertible at any time until the close of business on the second scheduled trading day immediately preceding the maturity date. Upon conversion, holders of the Notes will receive shares of the Company's common stock, cash or a combination thereof, at the Company's election. It is the Company's current intent and policy to settle all conversions through combination settlement, which involves satisfying the principal amount outstanding with cash and any note conversion value over the principal amount in shares of the Company's common stock.

Notes with a par value of $11,000 were submitted for conversion in the fourth quarter of 2017, and this conversion was settled in the first quarter of 2018. The conversion resulted in the issuance of a nominal amount of shares of the Company's common stock, and the Company recorded a loss of $1,000 on the conversion of these Notes. The Notes are not convertible as of March 31, 2018 and are classified as long term liabilities on the Company's consolidated balance sheet as of December 31, 2017.

The conversion rate for the Notes will initially be 31.1813 shares of the Company's common stock per $1,000 principal amount of Notes, which is equivalent to an initial conversion price of approximately $32.07 per common share, and is subject to adjustment under the terms of the Notes. Holders of the Notes may require the Company to repurchase their Notes upon the occurrence of a fundamental change prior to maturity for cash at a repurchase price equal to 100% of the principal amount of the Notes to be repurchased plus accrued and unpaid interest, if any, to, but excluding, the repurchase date.

The Company will not have the right to redeem the Notes prior to June 5, 2019, but may redeem the Notes, at its option, in whole or in part, on any business day on or after June 5, 2019 and prior to the maturity date if the last reported sale price of the Company's common stock has been at least 130% of the conversion price then in effect for at least 20 trading days (whether or not consecutive) during any 30 consecutive trading day period ending on, and including, the trading day immediately preceding the date on which the Company provides written notice of redemption. The redemption price will be equal to 100% of the principal amount of the principal amount of Notes to be redeemed plus accrued and unpaid interest to, but excluding, the redemption date.

The Notes contain customary terms and events of default. If an event of default (other than certain events of bankruptcy, insolvency or reorganization involving the Company) occurs and is continuing, the holders of at least 25% in aggregate principal amount of the outstanding Notes may declare 100% of the principal of, and any accrued and unpaid interest on, all of the Notes to be due and payable. Upon the occurrence of certain events of bankruptcy, insolvency or reorganization involving the Company, 100% of the principal of and accrued and unpaid interest, if any, on all of the Notes will become due and payable automatically. Notwithstanding the foregoing, the Notes provide that, to the extent the Company elects and for up to 270 days, the sole remedy for an event of default relating to certain failures by the Company to comply with certain reporting covenants consist exclusively of the right to receive additional interest on the Notes. The Company is not aware of any events of default, current events or market conditions that would allow holders to call or convert the Notes as of March 31, 2018.

The cash conversion feature of the Notes required bifurcation from the Notes and was initially accounted for as an equity instrument classified to stockholders' equity, as the conversion feature was determined to be clearly and closely related to the Company's stock. Based on market data available for publicly traded, senior, unsecured corporate bonds issued by companies in the same industry and asset base and with similar maturity, the Company estimated the implied interest rate, assuming no conversion option. Assumptions used in the estimate represent what market participants would use in pricing the liability component, including market interest rates, credit standing, and yield curves, all of which are defined as Level 2 observable inputs. The estimated implied interest rate was applied to the Notes, which resulted in a fair value of the liability component of $96,289,000 upon issuance, calculated as the present value of implied future payments based on the $115 million aggregate principal amount. The equity component of the Notes was recognized as a debt discount, recorded in additional paid-in capital, and represents the difference between the aggregate principal of the Notes and the fair value of the Notes without conversion option on their issuance date. The debt discount is amortized to interest expense using the effective interest method over five years, or the life of the Notes. The Company assesses the equity classification of the cash conversion feature quarterly, and it is not remeasured as long as it continues to meet the conditions for equity classification.

Interest expense recognized on the Notes during the three-month period ended March 31, 2018 includes $611,000, $881,000 and $155,000 for the contractual coupon interest, the accretion of the debt discount and the amortization of the debt issuance costs, respectively. The effective interest rate on the Notes is 6.6%, which includes the interest on the Notes, amortization of the debt discount and debt issuance costs. As of March 31, 2018, the carrying value of the Notes was approximately $100.3 million and the fair value of the principal was approximately $150.5 million. The fair value of the Notes was determined based on the most recent trade activity of the Notes as of March 31, 2018.

11. Stock-Based Compensation

For the three-month periods ended March 31, 2018 and 2017, the Company recorded stock-based compensation expense of approximately $2,268,000 and $1,531,000, respectively, for share-based awards granted under the Second Amended and Restated 2001 Repligen Corporation Stock Plan (the "2001 Plan") and the Repligen Corporation Amended and Restated 2012 Stock Option and Incentive Plan (the "2012 Plan," and together with the 2001 Plan, the "Plans").

The following table presents stock-based compensation expense included in the Company's consolidated statements of comprehensive income (in thousands):

	Three Months Ended March 31,	
	2018	2017
Cost of product revenue	$ 266	$ 141
Research and development	170	132
Selling, general and administrative	1,832	1,258
Total	$ 2,268	$ 1,531

The 2012 Plan allows for the granting of incentive and nonqualified options to purchase shares of common stock, restricted stock and other equity awards. Employee grants under the Plans generally vest over a three- to five-year period, with 20%-33% vesting on the first anniversary of the date of grant and the remainder vesting in equal yearly installments thereafter. Nonqualified options issued to non-employee directors under the Plans generally vest over one year. In the first quarter of 2018, to create a longer term retention incentive, the Company's Compensation Committee granted long term incentive compensation awards to its chief executive officer consisting of both stock options and restricted stock units that are subject to time-based vesting over nine years. Options granted under the Plans have a maximum term of ten years from the date of grant and generally, the exercise price of the stock options equals the fair market value of the Company's common stock on the date of grant. At March 31, 2018, options to purchase 1,109,353 shares and 703,076 restricted stock units were outstanding under the Plans. At March 31, 2018, 254,907 shares were available for future grant under the 2012 Plan.

The Company uses the Black-Scholes option pricing model to calculate the fair value of stock option awards on the grant date, and the Company uses the value of the common stock as of the grant date to value restricted stock units. The Company measures stock-based compensation cost at the grant date based on the estimated fair value of the award. The Company recognizes expense on awards with service based vesting over the employee's requisite service period on a straight-line basis. In the third quarter of 2017, the Company issued performance stock units to certain individuals related to the Spectrum Acquisition which are tied to the achievement of certain revenue and gross margin metrics and the passage of time. The Company recognizes expense on performance based awards over the vesting period based on the probability that the performance metrics will be achieved. The Company recognizes stock-based compensation expense for options that are ultimately expected to vest, and accordingly, such compensation expense has been adjusted for estimated forfeitures.

Information regarding option activity for the three-month period ended March 31, 2018 under the Plans is summarized below:

	Options Outstanding	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Contractual Term (in years)	(in thousands) Aggregate Intrinsic Value
Options outstanding at December 31, 2017	734,940	$ 20.80		
Granted	398,532	33.85		
Exercised	(14,531)	23.70		
Forfeited/cancelled	(9,588)	29.71		
Options outstanding at March 31, 2018	1,109,353	$ 25.34	7.51	$ 12,176
Options exercisable at March 31, 2018	499,504	$ 17.73	5.50	$ 9,300
Vested and expected to vest at March 31, 2018 (1)	1,057,255	$ 24.96	7.40	$ 12,015

(1) Represents the number of vested options as of March 31, 2018 plus the number of unvested options expected to vest as of March 31, 2018 based on the unvested outstanding options at March 31, 2018 adjusted for estimated forfeiture rates of 8% for awards granted to non-executive level employees and 3% for awards granted to executive level employees.

The aggregate intrinsic value in the table above represents the total pre-tax intrinsic value (the difference between the closing price of the common stock on March 31, 2018 of $36.18 per share and the exercise price of each in-the-money option) that would have been received by the option holders had all option holders exercised their options on March 31, 2018.

The weighted average grant date fair value of options granted during the three-month periods ended March 31, 2018 and 2017 was $18.27 and $16.46, respectively. The total fair value of stock options that vested during the three-month periods ended March 31, 2018 and 2017 was approximately $1,339,000 and $1,195,000, respectively.

Information regarding restricted stock unit and performance stock unit activity for the three-month period ended March 31, 2018 under the Plans is summarized below:

	Units Outstanding	Weighted-Average Remaining Contractual Term (in years)	(in thousands) Aggregate Intrinsic Value
Restricted and performance stock units outstanding at December 31, 2017	505,235		
Granted	319,701		
Exercised	(90,691)		
Forfeited/cancelled	(31,169)		
Restricted stock units outstanding at March 31, 2018	703,076	4.06	$ 25,437
Vested and expected to vest at March 31, 2018 (1)	639,530	3.75	$ 23,138

(1) Represents the number of vested restricted stock units as of March 31, 2018 plus the number of unvested restricted stock units expected to vest as of March 31, 2018 based on the unvested outstanding restricted stock units at March 31, 2018 adjusted for estimated forfeiture rates of 8% for awards granted to non-executive level employees and 3% for awards granted to executive level employees.

The aggregate intrinsic value in the table above represents the total pre-tax intrinsic value (equal to the closing price of the common stock on March 31, 2018 of $36.18 per share) that would have been received by the restricted stock unit holders had all restricted stock units vested on March 31, 2018. The aggregate intrinsic value of restricted stock units vested during the three-month periods ended March 31, 2018 and 2017 was approximately $3,224,000 and $2,064,000, respectively.

The weighted average grant date fair value of restricted stock units granted during the three-month periods ended March 31, 2018 and 2017 was $33.80 and $32.18, respectively. The total grant date fair value of restricted stock units that vested during the three-month periods ended March 31, 2018 and 2017 was approximately $2,619,000 and $1,616,000, respectively.

As of March 31, 2018, there was $30,762,000 of total unrecognized compensation cost related to unvested share-based awards. This cost is expected to be recognized over a weighted average remaining requisite service period of 4.66 years.

12. Income Taxes

The Company's effective tax rate for the three-month period ended March 31, 2018 was 24.7% compared to 24.6% for the corresponding period in the prior year. The effective tax rate for the three-month period ended March 31, 2018 was higher than the U.S. statutory tax rate of 21% due to state tax effects and the impact of the Global Intangible Low-Taxed Income ("GILTI") tax enacted as part of the Tax Cuts and Jobs Act (the "Act") enacted in December 2017. The effective tax rate for the three-month period ended March 31, 2017 was lower than the U.S. statutory tax rate of 34% mainly due to lower statutory tax rates in foreign jurisdictions.

ASU 2016-16 requires the income tax consequences of intra-entity transfers of assets other than inventory to be recognized when the intra-entity transfer occurs rather than deferring recognition of income tax consequences until the transfer was made with an outside party. The Company adopted the provisions of this ASU in the first quarter of 2018. The adoption resulted in a decrease of $5,609,000 to other assets, a decrease of $4,932,000 to deferred tax liabilities and a decrease of $677,000 to accumulated deficit at January 1, 2018.

At December 31, 2017, the Company had net operating loss carryforwards of approximately $19,652,000 in the U.S., net operating loss carryforwards of approximately €603,000 (approximately $743,000) in Germany, federal business tax credit carryforwards of $297,000 and state business tax credit carryforwards of approximately $99,000 available to reduce future domestic income taxes, if any. The net operating loss and business tax credits carryforwards will continue to expire at various dates through December 2037. The net operating loss and business tax credit carryforwards are subject to review and possible adjustment by the Internal Revenue Service. While an IRC Section 382 study was completed in the second quarter of 2017, and no current limitations were identified, use of these net operating loss and business tax credit carryforwards may be limited in the future based on certain changes in the ownership interest of significant stockholders.

On December 22, 2017, the Act was signed into law. The Act made significant changes to federal tax law, including, but not limited to, a reduction in the federal income tax rate from 35% to 21%, taxation of certain global intangible low-taxed income, allowing for immediate expensing of qualified assets, stricter limits on deductions for interest and certain executive compensation, and a one-time transition tax on previously deferred earnings of certain foreign subsidiaries. Due to the complexities involved in accounting for the enactment of the Act, the SEC issued Staff Accounting Bulletin No. 118 ("SAB 118"), which allows a registrant to record provisional amounts during a measurement period not to extend beyond one year of the enactment date. Under the SAB 118 guidance, we have determined that our accounting for the following items is incomplete where noted, we are able to make reasonable estimates for certain effects of tax reform and therefore have recorded provisional amounts.

The Act lowered the Company's U.S. statutory federal tax rate from 35% to 21% effective January 1, 2018. The Company recorded a tax benefit of $12,812,000 in the year ended December 31, 2017 for the reduction in its US deferred tax assets and liabilities resulting from the rate change.

The Act also includes a one-time deemed repatriation transition tax whereby entities that are shareholders of a specified foreign corporation must include in gross income the undistributed and previously untaxed post-1986 earnings and profits of the specified foreign corporation. The provisional amount recorded at December 31, 2017 increased the Company's tax provision by $3,266,000. This amount may change as the Company refines its calculations of post-1986 earnings and profits for our foreign subsidiaries, as well as the amounts held in cash.

The Company anticipates that future guidance and interpretations with the respect to the Act will cause the Company to further adjust its provisional amounts recorded as of December 31, 2017. No further adjustments have been made to these provisional amounts in the first quarter of 2018. Any measurement period adjustments will be reported as a component of provision for income taxes in the reporting period the amounts are determined. The final accounting will be completed no later than one year from the enactment of the Act.

The Company's tax returns are subject to examination by federal, state and international taxing authorities for the following periods:

Jurisdiction	Fiscal years subject to examination
United States – federal and state	2014-2017
Sweden	2011-2017
Germany	2017
Netherlands	2012-2017

13. Fair Value Measurement

In determining the fair value of its assets and liabilities, the Company uses various valuation approaches. The Company employs a hierarchy for inputs used in measuring fair value that maximizes the use of observable inputs and minimizes the use of unobservable inputs by requiring that observable inputs be used when available. Observable inputs are inputs that market participants would use in pricing the asset or liability based on market data obtained from sources independent of the Company. Unobservable inputs are inputs that reflect the Company's assumptions about the inputs that market participants would use in pricing the asset or liability and are developed based on the best information available in the circumstances. The fair value hierarchy is broken down into three levels based on the source of inputs as follows:

Level 1– Valuations based on unadjusted quoted prices in active markets for identical assets or liabilities that the Company has the ability to access

Level 2– Valuations based on quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets or liabilities in markets that are not active and models for which all significant inputs are observable, either directly or indirectly

Level 3– Valuations based on inputs that are unobservable and significant to the overall fair value measurement

The availability of observable inputs can vary among the various types of financial assets and liabilities. To the extent that the valuation is based on models or inputs that are less observable or unobservable in the market, the determination of fair value requires more judgment. In certain cases, the inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, for financial statement disclosure purposes, the level in the fair value hierarchy within which the fair value measurement is categorized is based on the lowest level input that is significant to the overall fair value measurement.

The Company's fixed income investments have historically comprised of obligations of U.S. government agencies and corporate marketable securities. These investments have been initially valued at the transaction price and subsequently valued, at the end of each reporting period, utilizing third party pricing services or other market observable data. The pricing services utilize industry standard valuation models, including both income and market based approaches and observable market inputs to determine value. These observable market inputs include reportable trades, benchmark yields, credit spreads, broker/dealer quotes, bids, offers, current spot rates and other industry and economic events. At least annually, the Company validates applicable prices provided by third party pricing services by reviewing their pricing methods and matrices, obtaining market values from other pricing sources, analyzing pricing data in certain instances and confirming that the relevant markets are active.

As of March 31, 2018 and December 31, 2017, the Company had no assets or liabilities for which fair value measurement is either required or has been elected to be applied.

In May 2016, the Company issued $115 million aggregate principal amount of the Notes due June 1, 2021. Interest is payable semi-annually in arrears on June 1 and December 1 of each year, beginning December 1, 2016. As of March 31, 2018, the carrying value of the Notes was approximately $100.3 million, net of unamortized discount, and the fair value of the Notes was approximately $150.5 million. The fair value of the Notes was determined based on the most recent trade activity of the Notes as of March 31, 2018. These valuations are Level 1 valuations, as the valuations are based on unadjusted quoted prices in active markets that the Company has the ability to access. The Notes are discussed in more detail in Note 10, "Long Term Debt . "

There were no re-measurements to fair value during the three months ended March 31, 2018 of financial assets and liabilities that are not measured at fair value on a recurring basis.

14. Commitments and Contingencies

The Company leases its headquarters in Waltham, Massachusetts as well as certain of its office and manufacturing space around the world.

In February 2018, the Company entered into an agreement to lease 63,761 square feet of office and manufacturing space in Marlborough, Massachusetts from U.S. REIF 111 Locke Drive Massachusetts, LLC (the "Premises").

The lease commences during the second quarter of 2018 (the "Commencement Date") and shall continue for a period of 126 consecutive months, unless earlier terminated in accordance with the terms of the lease (the "Lease Term"). Under the lease, the Company has the option to extend the Lease Term for two additional five-year periods.

Fixed rent with respect to 40,000 square feet of the Premises only shall commence on the Commencement Date, and rent for the full 63,761 square feet of the Premises shall begin 19 months following the Commencement Date. Under the terms of the lease, the Company has provided a letter of credit of approximately $163,000 as a security deposit and is required to pay its pro rata share of any building operating expenses and real estate taxes.

Future minimum rental commitments under the Company's leases as of March 31, 2018 are as follows (in thousands):

	Minimum Rental Commitments
2018 (nine months remaining)	$ 3,191
2019	3,808
2020	3,653
2021	3,342
2022	1,968
Thereafter	4,401

15. Related Party Transactions

Certain facilities leased by Spectrum are owned by the former owner of Spectrum, who currently holds greater than 10% of the Company's outstanding common stock. The lease amounts paid to this shareholder were negotiated in connection with the Spectrum Acquisition. The Company has incurred rent expense totaling $201,000 for the three-month period ended March 31, 2018 related to these leases.

16. Segment Reporting

The Company views its operations, makes decisions regarding how to allocate resources and manages its business as one operating segment. As a result, the financial information disclosed herein represents all of the material financial information related to the Company's sole operating segment.

The following table represents the Company's total revenue by geographic area (based on the location of the customer):

	Three months ended March 31,	
	2018	2017
North America	45%	38%
Europe	43%	54%
Asia and Australia	11%	8%
Other	1%	—
Total	100%	100%

Revenue from significant customers as a percentage of the Company's total revenue is as follows:

	Three months ended March 31,	
	2018	2017
GE Healthcare	17%	27%
MilliporeSigma	14%	21%

Significant accounts receivable balances as a percentage of the Company's total trade accounts receivable are as follows:

	March 31, 2018	December 31, 2017
GE Healthcare	19%	11%
MilliporeSigma	20%	19%

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Overview

Repligen and its subsidiaries, collectively doing business as Repligen Corporation ("Repligen", "we", "our", or "the Company") is a leading provider of advanced bioprocessing technology and solutions used in the process of manufacturing biologic drugs. Our products are made to substantially increase biopharmaceutical manufacturing efficiencies and flexibility. As the global biologics market continues to experience strong growth and expansion, our customers – primarily large biopharmaceutical companies and contract manufacturing organizations – face critical production cost, capacity, quality and time pressures that our products are made to address. Our commitment to bioprocessing is helping to set new standards for the way our customers manufacture biologic drugs – monoclonal antibodies, recombinant proteins, vaccines and gene therapies. We are dedicated to inspiring advances in bioprocessing as a trusted partner in the production of biologic drugs that improve human health worldwide.

Prior to 2012, the Company was focused on drug development, with clinical trial costs supported by bioprocessing product sales. At that time our bioprocessing business was largely represented by sales of Protein A ligands, which we sell through long term original equipment manufacturer (OEM) supply agreements. Our 2011 acquisition of Novozymes Biopharma Sweden AB further expanded our proteins product portfolio and provided impetus to set a new direction for the company. By mid-2012, we permanently discontinued and have since divested all drug development programs. We retained our proteins OEM business and, through internal innovation and strategic acquisitions, we have built chromatography and filtration product offerings that we sell direct to biologics manufacturers. We continue to seek out strategic opportunities to strengthen and expand our bioprocessing business.

We currently operate as one bioprocessing business, with a comprehensive suite of products to serve both upstream and downstream processes in biologic drug manufacturing. Building on over 35 years of industry expertise, we have developed a broad and diversified product portfolio that reflects our commitment to build a best-in-class bioprocessing technology company with a world-class direct sales and commercial organization. Our OEM Protein products are represented by our Protein A ligands and cell culture growth factor products. Our direct-to customer Chromatography product line includes a number of products used in the downstream purification and quality control of biological drugs, including our OPUS pre-packed chromatography column line, chromatography resins and ELISA test kits. Our direct-to-customer Filtration product line includes our XCell™ ATF system for use in upstream process intensification, our Sius™ TFF cassettes for use in downstream purification and formulation processes, our KrosFlo ® line of hollow-fiber cartridges and TFF systems, and our ProConnex ® single-use tubing sets. With the addition of Spectrum LifeSciences LLC in August 2017 (the "Spectrum Acquisition"), we now in-house manufacture hollow-fiber filters that can be used in our XCell ATF system and have increased our direct sales presence in Europe and Asia, while diversifying our end markets beyond monoclonal antibodies to include vaccines, recombinant protein and gene therapies.

Critical Accounting Policies and Estimates

A "critical accounting policy" is one which is both important to the portrayal of our financial condition and results and requires management's most difficult, subjective or complex judgments, often as a result of the need to make estimates about the effect of matters that are inherently uncertain. For additional information, please see the discussion of our critical accounting policies in Management's Discussion and Analysis of Financial Condition and Results of Operations and our significant accounting policies in Note 2 to the Financial Statements included in our Annual Report on Form 10-K for the year ended December 31, 2017.

Results of Operations

Revenues

Revenues for the three-month periods ended March 31, 2018 and 2017 were as follows:

	Three months ended March 31,			
(in thousands, except percentages)	2018	2017	$ Change	% Change
Product revenue	$44,799	$30,569	$14,230	47%
Royalty and other revenue	31	21	10	48%
Total revenue	$44,830	$30,590	$14,240	47%

Sales of bioprocessing products for the three months ended March 31, 2018 and 2017 were $44,799,000 and $30,569,000, respectively, representing an increase of $14,230,000, or 47%. This increase was primarily due to continued adoption of our products by our key bioprocessing customers and, for the first quarter of 2018, the addition of revenues following the Spectrum Acquisition. Sales of our bioprocessing products are impacted by the timing of orders, development efforts at our customers or end-users and regulatory approvals for biologics that incorporate our products, which may result in significant quarterly fluctuations. Such quarterly fluctuations are expected, but they may not be predictive of future revenue or otherwise indicate a trend.

Costs and operating expenses

Total costs and operating expenses for the three-month periods ended March 31, 2018 and 2017 were comprised of the following:

	Three months ended March 31,			
(in thousands, except percentages)	2018	2017	$ Change	% Change
Cost of product revenue	$19,668	$13,990	$ 5,678	41%
Research and development	3,288	1,742	1,546	89%
Selling, general and administrative	15,898	9,182	6,716	73%
Total costs and operating expenses	$38,854	$24,914	$13,940	56%

Cost of product revenue was approximately $19,668,000 and $13,990,000 for the three-month periods ended March 31, 2018 and 2017, respectively, an increase of $5,678,000, or 41%. This increase is primarily due to the increased product revenue noted above. Gross margins may fluctuate over the remainder of 2018 based on expected production volume and shipments and product mix.

Research and development expenses were approximately $3,288,000 and $1,742,000 for the three-month periods ended March 31, 2018 and 2017, respectively, an increase of $1,546,000, or 89%. This increase is related to product development activities acquired as part of the Spectrum Acquisition and increased activity on our various bioprocessing product development projects. Expenses generally include personnel costs, external development costs, supplies and other expenses related to our new products in development.

Selling, general and administrative expenses were approximately $15,898,000 and $9,182,000 for the three-month periods ended March 31, 2018 and 2017, respectively, an increase of $6,716,000, or 73%. This increase is due to selling and administrative activities incurred following the Spectrum Acquisition, as well as the continued buildout of our administrative infrastructure to support future growth and continued expansion of our customer-facing activities to drive sales of our bioprocessing products.

Investment income

Investment income for the three-month periods ended March 31, 2018 and 2017 was as follows:

	Three months ended March 31,			
(in thousands, except percentages)	2018	2017	$ Change	% Change
Investment income	$181	$ 96	$ 85	89%

Investment income includes income earned on invested cash balances. The increase in investment income in the first quarter of 2018 over the prior year period is attributable to higher average invested cash balances and higher interest rates on such cash balances.

Interest expense

Interest expense for the three-month periods ended March 31, 2018 and 2017 was as follows:

	Three months ended March 31,			
(in thousands, except percentages)	2018	2017	$ Change	% Change
Interest expense	$(1,652)	$(1,585)	$ (67)	(4%)

Interest expense in the three-month periods ended March 31, 2018 and 2017 is attributable to interest on our convertible senior notes issued in May 2016.

Other income (expense)

Other expense for the three-month periods ended March 31, 2018 and 2017 was as follows:

	Three months ended March 31,			
(in thousands, except percentages)	**2018**	**2017**	**$ Change**	**% Change**
Other expense	$ 71	$(120)	$ 191	159%

Other income was approximately $71,000 and other expense was approximately ($120,000) for the three-month periods ended March 31, 2018 and 2017, respectively. Other income (expense) in each period was primarily attributable to foreign currency gains (losses) on cash balances denominated in U.S. dollars and British pounds held and subsequently converted to local currency holdings by Repligen Sweden.

Provision for income taxes

Provision for income taxes for the three-month periods ended March 31, 2018 and 2017 was as follows:

	Three months ended March 31,			
(in thousands, except percentages)	**2018**	**2017**	**$ Change**	**% Change**
Income tax provision	$1,128	$999	$ 129	13%

For the three months ended March 31, 2018, we had income before taxes of $4,576,000 and recorded a tax provision of $1,128,000 for an effective tax rate of 24.7%. The effective income tax rate is based upon the estimated income for the year and the composition of the income in different jurisdictions. The effective tax rate is higher the U.S. statutory tax rate of 21% due to state tax effects and the impact of the Global Intangible Low-Taxed Income ("GILTI") tax enacted as part of the Tax Cuts and Jobs Act enacted in December 2017. For the three months ended March 31, 2017, we had income before taxes of $4,067,000 and recorded a tax provision of $999,000 for an effective tax rate of approximately 24.6%. The effective tax rate differs from the U.S. statutory tax rate primarily due to lower statutory tax rates in foreign jurisdictions.

Non-GAAP Financial Measures

We provide non-GAAP adjusted income from operations; adjusted net income; and adjusted EBITDA as supplemental measures to GAAP measures regarding our operating performance. These financial measures exclude the items detailed below and, therefore, have not been calculated in accordance with GAAP. A detailed explanation and a reconciliation of each non-GAAP financial measure to its most comparable GAAP financial measure is provided below.

We include this financial information because we believe these measures provide a more accurate comparison of our financial results between periods and more accurately reflect how management reviews its financial results. We excluded the impact of certain acquisition-related items because we believe that the resulting charges do not accurately reflect the performance of our ongoing operations for the period in which such charges are incurred.

Adjusted Income from Operations

Adjusted income from operations is measured by taking income from operations as reported in accordance with GAAP and excluding acquisition and integration costs, amortization of intangible assets and inventory step-up charges booked through our consolidated statements of comprehensive income. The following is a reconciliation of income from operations in accordance with GAAP to adjusted income from operations for the three-month periods ended March 31, 2018 and 2017 (in thousands):

	Three Months Ended March 31,	
	2018	2017
GAAP income from operations	$ 5,976	$ 5,676
Adjustments to income from operations:		
Acquisition and integration costs	655	402
Intangible amortization	2,664	715
Inventory step-up charges	—	224
Adjusted income from operations	$ 9,295	$ 7,017

Adjusted Net Income

Adjusted net income is measured by taking net income as reported in accordance with GAAP and excluding acquisition and integration costs and related tax effects, amortization of intangible assets and related tax effects, inventory step-up charges and non-cash interest expense booked through our consolidated statements of comprehensive income. The following is a reconciliation of net income in accordance with GAAP to adjusted net income for the three-month periods ended March 31, 2018 and 2017:

	Three Months Ended March 31,			
	2018		2017	
	(in thousands) Amount	Fully Diluted Earnings per Share	(in thousands) Amount	Fully Diluted Earnings per Share
GAAP net income	$ 3,448	$ 0.08	$ 3,068	$ 0.09
Adjustments to net income:				
Acquisition and integration costs	655	0.01	402	0.01
Intangible amortization	2,664	0.06	715	0.02
Inventory step-up charges	—	—	224	0.01
Non-cash interest expense	1,036	0.02	970	0.03
Tax effect of intangible amortization and acquisition costs	(271)	(0.01)	(101)	(0.00)
Adjusted net income	$ 7,532	$ 0.17	$ 5,278	$ 0.15

Per share totals may not add due to rounding.

Adjusted EBITDA

Adjusted EBITDA is measured by taking net income as reported in accordance with GAAP, excluding investment income, interest expense, taxes, depreciation and amortization, and excluding acquisition and integration costs and inventory step-up charges booked through our consolidated statements of comprehensive income. The following is a reconciliation of net income in accordance with GAAP to adjusted EBITDA for the three-month periods ended March 31, 2018 and 2017 (in thousands):

	Three Months Ended March 31,	
	2018	2017
GAAP net income	$ 3,448	$ 3,068
Adjustments to net income:		
Investment income	(181)	(96)
Interest expense	1,652	1,585
Tax provision	1,128	999
Depreciation	1,284	928
Amortization	2,664	715
EBITDA	9,995	7,199
Other adjustments:		
Acquisition and integration costs	655	402
Inventory step-up charges	—	224
Adjusted EBITDA	$ 10,650	$ 7,825

Liquidity and Capital Resources

We have financed our operations primarily through revenues derived from product sales, research grants, proceeds and royalties from license arrangements, a litigation settlement, sales of equity securities and issuance of convertible debt. Our revenue for the foreseeable future will primarily be limited to our bioprocessing product revenue.

At March 31, 2018, we had cash and cash equivalents of $173,876,000 compared to cash and cash equivalents of $173,759,000 at December 31, 2017.

Operating activities

For the three-month period ended March 31, 2018, our operating activities provided cash of $1,572,000 reflecting net income of $3,448,000 and non-cash charges totaling $7,714,000 primarily related to depreciation, amortization, non-cash interest expense, deferred tax expense and stock-based compensation charges. An increase in accounts receivable consumed $1,529,000 of cash, and was primarily driven by the 46% quarter over quarter increase in revenues. Payments of accounts payable and accrued liabilities consumed $5,389,000 of cash, and were mainly due to the timing of payments of payables and payment of 2017 incentive compensation programs. The remaining cash flow used in operations resulted from net unfavorable changes in various other working capital accounts.

For the three-month period ended March 31, 2017, our operating activities provided cash of $1,147,000 reflecting net income of $3,068,000 and non-cash charges totaling $4,152,000 primarily related to depreciation, amortization, non-cash interest expense and stock-based compensation charges. An increase in accounts receivable consumed $2,415,000 of cash, and was primarily due to the 22% quarter over quarter increase in revenues. A decrease in accounts payable consumed $452,000 of cash, which was primarily due to the timing of purchases and payments to vendors. Payments of accrued liabilities consumed $4,220,000 of cash, and were mainly due to the payment of contingent consideration to Refine Technology and Atoll GmbH related to 2016 sales milestones. The remaining cash flow used in operations resulted from net favorable changes in various other working capital accounts.

Investing activities

Our investing activities consumed $1,564,000 of cash related to capital expenditures for the three-month period ended March 31, 2018. Our investing activities provided $6,077,000 for the three-month period ended March 31, 2017, primarily due to net redemptions of marketable securities of $7,372,000 offset by $1,295,000 used for fixed asset additions.

Financing activities

For the three-month period ended March 31, 2018, our financing activities provided $333,000 of cash. We received proceeds of $344,000 from stock option exercises, partially offset by cash outlays of $11,000 related to the conversion of certain senior convertible notes in the first quarter of 2018. For the three-month period ended March 31, 2017, our financing activities used $330,000 of cash. We made contingent consideration payments of $1,663,000 related to the initial valuation of the likelihood that the 2016 XCell™ ATF sales milestones and Atoll revenue growth milestones would be achieved. These payments were partially offset by proceeds from stock option exercises totaling $1,333,000.

We do not currently use derivative financial instruments.

Working capital increased by approximately $10,430,000 to $228,001,000 at March 31, 2018 from $217,571,000 at December 31, 2017 due to the various changes noted above.

Our future capital requirements will depend on many factors, including the following:

- the expansion of our bioprocessing business;
- our identification and execution of strategic acquisitions or business combinations;
- the ability to sustain sales and profits of our bioprocessing products;
- market acceptance of our new products;
- our ability to acquire additional bioprocessing products;
- the resources required to successfully integrate our recently acquired businesses and recognize expected synergies;
- the scope of and progress made in our research and development activities;
- the extent of any share repurchase activity;
- the election of any Note holders to convert their Notes during an eligible period; and
- the success of any proposed financing efforts.

Absent acquisitions of additional businesses, products, product candidates or intellectual property, we believe our current cash balances are adequate to meet our cash needs for at least twelve months from the date of this filing. We expect operating expenses to increase as we integrate Spectrum into our business, continue to develop and expand our bioprocessing product lines and expand our commercial capabilities for the foreseeable future. Our future capital requirements may include, but are not limited to, purchases of property, plant and equipment, the acquisition of additional bioprocessing products and technologies to complement our existing manufacturing capabilities, continued investment in our intellectual property portfolio and future repayment of convertible debt.

We plan to continue to invest in our bioprocessing business and in key research and development activities associated with the development of new bioprocessing products. We actively evaluate various strategic transactions on an ongoing basis, including monetizing existing assets and licensing or acquiring complementary products, technologies or businesses that would complement our existing portfolio of development programs. We continue to seek to acquire such potential assets that may offer us the best opportunity to create value for our shareholders. In order to acquire such assets, we may need to seek additional financing to fund these investments. This may require the issuance or sale of additional equity or debt securities. The sale of additional equity may result in additional dilution to our stockholders. Should we need to secure additional financing to acquire a product, fund future investment in research and development, or meet our future liquidity requirements, we may not be able to secure such financing, or obtain such financing on favorable terms because of the volatile nature of the biotechnology marketplace.

Off-Balance Sheet Arrangements

We do not have any special purpose entities or off-balance sheet financing arrangements as of March 31, 2018.

Cautionary Statement Regarding Forward-Looking Statements

This Quarterly Report on Form 10-Q contains forward-looking statements which are made pursuant to the safe harbor provisions of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended (the “Exchange Act”). The forward-looking statements in this Quarterly Report on Form 10-Q do not constitute guarantees of future performance. Investors are cautioned that statements in this Quarterly Report on Form 10-Q which are not strictly historical statements, including, without limitation, express or implied statements or guidance regarding current or future financial performance

and position, potential impairment of future earnings, management's strategy, plans and objectives for future operations or acquisitions, product development and sales, product candidate research, development and regulatory approval, selling, general and administrative expenditures, intellectual property, development and manufacturing plans, availability of materials and product and adequacy of capital resources and financing plans constitute forward-looking statements. Such forward-looking statements are subject to a number of risks and uncertainties that could cause actual results to differ materially from those anticipated, including, without limitation, risks associated with: the success of current and future collaborative or supply relationships, including our agreements with BioMarin, GE Healthcare and MilliporeSigma, our ability to successfully grow our bioprocessing business, including as a result of acquisitions, commercialization or partnership opportunities, and our ability to develop and commercialize products, our ability to obtain required regulatory approvals, our compliance with all Food and Drug Administration regulations, our ability to obtain, maintain and protect intellectual property rights for our products, the risk of litigation regarding our patent and other intellectual property rights, the risk of litigation with collaborative partners, our limited manufacturing capabilities and our dependence on third-party manufacturers and value-added resellers, our ability to hire and retain skilled personnel, the market acceptance of our products, reduced demand for our products that adversely impacts our future revenues, cash flows, results of operations and financial condition, our ability to compete with larger, better financed life sciences companies, our history of losses and expectation of incurring losses, our ability to generate future revenues, our ability to successfully integrate our recently acquired businesses, our ability to raise additional capital to fund potential acquisitions, our volatile stock price, and the effects of our anti-takeover provisions. Further information on potential risk factors that could affect our financial results are included in the filings made by us from time to time with the Securities and Exchange Commission including under the section entitled "Risk Factors" in our Annual Report on Form 10-K for the year ended December 31, 2017.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

Interest rate risk

We have historically invested funds in U.S. Government and agency securities. As a result, we have been exposed to potential loss from market risks that may occur as a result of changes in interest rates, changes in credit quality of the issuer or otherwise. As of March 31, 2018, we do not have any such investments; however, we may seek to invest funds in similar investment vehicles in the future, as specified in our investment policy guidelines. Our investment policy limits the amount of our credit exposure to any one issuer, (with the exception of U.S. government and agency securities) and type of instrument.

Foreign exchange risk

The reporting currency of the Company is U.S. dollars, and the functional currency of each of our foreign subsidiaries is its respective local currency. Our foreign currency exposures include the Swedish kronor, Euro, British pound, Chinese yuan, Japanese yen, Singapore dollar, South Korean won and Indian rupee; of these, the primary foreign currency exposures are the Swedish kronor, Euro and British pound. Exchange gains or losses resulting from the translation between the transactional currency and the functional currency are included in net income. Fluctuations in exchange rates may adversely affect our results of operations, financial position and cash flows. We currently do not seek to hedge this exposure to fluctuations in exchange rates.

ITEM 4. CONTROLS AND PROCEDURES

Disclosure Controls and Procedures

The Company's management, with the participation of the principal executive officer and the principal financial officer, has evaluated the effectiveness of the Company's disclosure controls and procedures (as defined in Rules 13a-15(e) or 15d-15(e) under the Securities Exchange Act of 1934, as amended (the "Exchange Act") as of the end of the period covered by this report. Based on such evaluation, the principal executive officer and principal financial officer have concluded that, as of the end of such period, the Company's disclosure controls and procedures were effective in ensuring that information required to be disclosed by the Company in the reports that it files or submits under the Exchange Act is recorded, processed, summarized and reported, on a timely basis, and is accumulated and communicated to the Company's management, including the Company's principal executive officer and the Company's principal financial officer, as appropriate, to allow timely decisions regarding required disclosure.

Changes in Internal Control

We acquired Spectrum LifeSciences, LLC ("Spectrum") in August 2017. The financial results of Spectrum are included in our consolidated financial statements as of and for the three-month period ended March 31, 2018. Spectrum represented approximately $35,159,000 of our total assets as of March 31, 2018 and $11,719,000 of revenues for the three-month period ended March 31, 2018. As this acquisition occurred during the second half of 2017, the scope of our assessment of our internal control over financial

reporting does not include Spectrum. This exclusion is in accordance with the SEC's general guidance that an assessment of a recently acquired business may be omitted from our scope in the year of acquisition. We are actively reviewing and updating Spectrum's internal control procedures, and management will report on Spectrum's internal controls in its report on internal control over financial reporting as of and for the year ended December 31, 2018.

Effective January 1, 2018, we adopted the provisions of ASC 606, "Revenue from Contracts with Customers." As part of the adoption of this standard, we reviewed our control procedures and have modified certain of our processes to ensure compliance with the new standard.

Other than the foregoing, there have been no changes in our internal control over financial reporting identified in connection with the evaluation required by paragraph (d) of Securities Exchange Act Rule 13a-15 or Rule 15d-15 that occurred in the three months ended March 31, 2018 that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

PART II. OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

From time to time, we may be subject to legal proceedings and claims in the ordinary course of business. We are not currently aware of any such proceedings or claims that we believe will have, individually or in the aggregate, a material adverse effect on our business, financial condition or results of operations.

ITEM 1A. RISK FACTORS

The matters discussed in this Quarterly Report on Form 10-Q include forward-looking statements that involve risks or uncertainties. These statements are neither promises nor guarantees, but are based on various assumptions by management regarding future circumstances, over many of which Repligen has little or no control. A number of important risks and uncertainties, including those identified under the caption "Risk Factors" in Item 1A in our Annual Report on Form 10-K for the year ended December 31, 2017 and subsequent filings, could cause our actual results to differ materially from those in the forward-looking statements. There are no material changes to the Risk Factors described in our Annual Report on Form 10-K for the fiscal year ended December 31, 2017.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

None.

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

None.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

ITEM 5. OTHER INFORMATION

None.

ITEM 6. EXHIBITS

(a) Exhibits

Exhibit Number	Document Description
3.1	Restated Certificate of Incorporation, dated September 30, 1992 and amended September 17, 1999 (filed as Exhibit 3.1 to Repligen Corporation's Quarterly Report on Form 10-Q for the quarter ended September 30, 1999 and incorporated herein by reference).
3.2	Certificate of Amendment to the Certificate of Incorporation of Repligen Corporation, effective as of May 16, 2014 (filed as Exhibit 3.1 to Repligen Corporation's Current Report on Form 8-K filed on May 19, 2014 and incorporated herein by reference).
3.3	Second Amended and Restated Bylaws (filed as Exhibit 3.1 to Repligen Corporation's Current Report on Form 8-K filed on May 23, 2017 and incorporated herein by reference).
10.1	Lease Agreement, dated February 6, 2018, by and between Repligen Corporation and U.S. REIF III Locke Drive Massachusetts, LLC (filed as Exhibit 10.1 to Repligen Corporation's Current Report on Form 8-K filed on February 8, 2018 and incorporated herein by reference).
10.2+#	Amendment No. 4 to Strategic Supplier Alliance Agreement, dated February 20, 2018, by and between Repligen Sweden AB and GE Healthcare Bio-Sciences AB.

Exhibit Number	Document Description
10.3 +	Repligen Corporation Amended and Restated Non-Employee Directors' Deferred Compensation Plan.
31.1 +	Rule 13a-14(a)/15d-14(a) Certification.
31.2 +	Rule 13a-14(a)/15d-14(a) Certification.
32.1 *	Certification pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.
101 +	The following materials from Repligen Corporation on Form 10-Q for the quarterly period ended March 31, 2018, formatted in Extensible Business Reporting Language (xBRL): (i) Condensed Consolidated Statements of Comprehensive Income (Loss), (ii) Condensed Consolidated Balance Sheets, (iii) Condensed Consolidated Statements of Cash Flows, and (iv) Notes to Condensed Consolidated Financial Statements, tagged as blocks of text.

\+ Filed herewith.
* Furnished herewith.
\# Confidential treatment has been requested for portions of the exhibit and is pending clearance with the Securities and Exchange Commission.

SIGNATURES

Pursuant to the requirements 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.

REPLIGEN CORPORATION

Date: May 8, 2018 By: /S/ TONY J. HUNT

Tony J. Hunt
President and Chief Executive Officer
(Principal executive officer)
Repligen Corporation

Date: May 8, 2018 By: /S/ JON SNODGRES

Jon Snodgres
Chief Financial Officer
(Principal financial officer)
Repligen Corporation

Exhibit 10.2

AMENDMENT NO. 4 TO STRATEGIC SUPPLIER ALLIANCE AGREEMENT

This Amendment No. 4 (the " **Fourth Amendment** ") to the certain Strategic Supplier Alliance Agreement dated as of July 7, 2011 (the "Supplier Agreement") by and between Repligen Sweden AB, formerly known as Novozymes Biopharma AB, (the "Supplier") a company organized under the laws of Sweden and a wholly owned subsidiary of Repligen Corporation ("Repligen") and GE Healthcare Bio-Sciences AB, a company organized under the laws of Sweden ("GEHC") is made effective as of the date of last signature (the " **Amendment Effective Date** ") with reference to the following:

WITNESSETH:

WHEREAS, the Supplier Agreement has previously been amended three times in accordance with; (1) an amendment made effective as of October 27, 2011 (the "Amendment No. 1"); (2) an amendment made effective February 22, 2013 (the "2013 Amendment"); and (3) an amendment made effective as of February 22, 2016 (the Amendment No. 3), together the "Previous Amendments"; and

WHEREAS, the Previous Amendments and the Supplier Agreement jointly hereinafter the "Agreement"

WHEREAS, GEHC and Supplier mutually wish to make certain modifications to the terms and conditions of the Agreement

WHEREAS, Section 18.8 of Attachment E to the Supplier Agreement provides that the Supplier Agreement may be modified only by a writing signed by both parties.

In the event that any terms and conditions contained herein are in conflict with the terms and conditions set forth in the Agreement or previously executed amendments thereto, the terms and conditions set forth in this Amendment shall be deemed to be the controlling terms and conditions.

NOW, THEREFORE, in consideration of the mutual covenants and agreements contained herein and other good and valuable consideration, the receipt and sufficiency of which are acknowledged, the parties to this Amendment agree as follows:

Portions of this Exhibit were omitted and have been filed separately with the Secretary of the Commission pursuant to the Company's application requesting confidential treatment under Rule 24b-2 of the Exchange Act; [*] denotes omissions.

1. Amendment.

a. Section 1(a) and (iii) of Amendment No. 3 erroneously called the Fourth Amendment. Both references to the "Fourth Amendment" shall be corrected to "Third Amendment."

b. The first sentence of Section 3(c), as previously amended by Section 2(c) of Amendment No. 3, is deleted and replaced with the following sentence:

"GEHC shall settle any undisputed invoices arising under this Agreement [*] after date of invoice prepared in accordance with the terms of this Agreement."

c. The first paragraph of Section 16.1 of Attachment E, as previously amended by Amendment No.1 and Section 2(l) of Amendment No. 3, is amended and replaced in its entirety as follows:

"This Agreement shall commence on the Effective Date and, subject as hereinafter provided, shall continue in effect until Dec 31 st 2019. Notwithstanding the aforementioned, GEHC may reduce its minimum purchase commitments for any or all Products from Supplier hereunder [*] upon [*] written notice to Supplier, provided that GEHC may not issue such notice of reduction until after [*]. However, in the event GEHC reduces its purchase commitment, what is set out in Section 2g of Amendment No. 3 shall apply accordingly.

If the Supplier deems that an investment is needed to meet the GEHC volume forecast for 2019, the Supplier shall notify and describe the clear rationale to GEHC for such an investment before implementation and GEHC shall review the request and send the Supplier GEHC´s recommendation to the requested investment within [*]. If GEHC express its support to the investment and only in the case that GEHC thereafter send a notice to the Supplier to reduce the purchase commitment, GEHC will reimburse the Supplier with the verified investments costs but maximum up to the level that was agreed in advance. For avoidance of doubt the GEHC reimbursement commitment is limited to [*]."

2. Ratification. The Agreement as amended hereby is ratified by each of the parties hereto and shall remain in full force and effect in accordance with its terms as so amended. This Amendment is not a consent to any waiver or modification of any other terms or conditions of the Agreement and shall not prejudice any rights which any of the parties may now or hereafter have in connection with the Agreement.

3. Counterparts. This Amendment may be signed in any number of counterparts, each of which shall be an original, and all of which taken together shall constitute a single amendment, with the same effect as if the signatures hereto and thereto were upon the same instrument.

Portions of this Exhibit were omitted and have been filed separately with the Secretary of the Commission pursuant to the Company's application requesting confidential treatment under Rule 24b-2 of the Exchange Act; [*] denotes omissions.

IN WITNESS WHEREOF, each of the parties hereto has caused this Amendment to the Agreement to be executed by its duly authorized officer or representative set forth below as of the Amendment Effective Date.

GE Healthcare Bio-Sciences AB	**Repligen Sweden AB**
/s/ Bo Lundström By (Signature)	/s/ Tony Hunt By (Signature)
Bo Lundström Printed Name	Tony Hunt Printed Name
Management Director Title	President & CEO Title
20/2-2018 Date	February 12, 2018 Date

Portions of this Exhibit were omitted and have been filed separately with the Secretary of the Commission pursuant to the Company's application requesting confidential treatment under Rule 24b-2 of the Exchange Act; [*] denotes omissions.

Exhibit 10.3

REPLIGEN CORPORATION

AMENDED AND RESTATED
NON-EMPLOYEE DIRECTORS' COMPENSATION POLICY

Cash Fees

Annual Retainer:

	Annual Retainer
Board of Directors (the " *Board* ")	
Each Non-Employee Member of the Board	$ 50,000
Additional Retainer for the Chairperson	$ 90,000
Audit Committee	
Committee Chairperson	$ 30,000
Other Committee Members	$ 10,000
Compensation Committee	
Committee Chairperson	$ 20,000
Other Committee Members	$ 10,000
Nominating and Corporate Governance Committee	
Committee Chairperson	$ 16,000
Other Committee Members	$ 5,000

The Annual Retainer will be paid quarterly, in arrears, or upon the earlier resignation or removal of the non-employee director. Amounts owing to non-employee directors as Annual Retainer shall be annualized, meaning that for non-employee directors who join the Board during the calendar year, such amounts shall be pro rated based on the number of calendar days served by such director.

Per Meeting fees:

None, unless otherwise specifically duly approved by the Board or any committee thereof hereafter.

Equity

Initial Equity Grant for a Non-Employee Director:

On the effective date of a new director's appointment or first election to the Board, such new director shall receive an option to purchase 24,000 shares of Common Stock on the date he or she joins the Board (the " ***Initial Award*** "). The "strike price" for the Initial Award shall be the Closing Price. The Initial Award shall vest annually in three equal installments on the first, second and third anniversary of the date of grant, provided that if a new director is first elected to the Board at an annual meeting of stockholders, then each vesting date in respect of such Initial Award shall be on such anniversary of the date of grant or the date of the annual meeting of stockholders during such year, whichever is earlier, subject in all cases to service on the Board on such date.

Annual Equity Grant for each Non-Employee Director:

Each non-employee director reelected to the Board at any annual meeting of stockholders shall receive an award of a stock option to purchase shares of Common Stock and an award of restricted stock units on such date (collectively, the " ***Annual Award*** ").

The stock option to be granted in the Annual Award (i) to the Chairperson of the Board shall have an aggregate value of $87,500 and (ii) to all other non-employee directors shall each have an aggregate value of $62,500. The number of shares subject to each such stock option shall be determined by the Company using a Black Scholes methodology and its customary assumptions therefor.

The number of restricted stock units to be granted in the Annual Award (i) to the Chairperson of the Board shall $87,500 divided by the Closing Price and (ii) to all other non-employee directors shall each be equal to shall be equal to $62,500 divided by the Closing Price.

Each Annual Award shall be fully vested on the anniversary of the date of grant or the date of the next annual meeting of stockholders, whichever is earlier, subject to service on the Board on such date.

Definitions

" ***Closing Price*** " shall mean the reported closing price of Repligen Corporation's Common Stock on the Nasdaq Global Market on any grant date, or the preceding business date if there are no market quotations on such date.

" ***Common Stock*** " shall mean the common stock of Repligen Corporation, par value $0.01 per share.

* * *

ADOPTED BY THE BOARD OF DIRECTORS on March 1, 2018.

Exhibit 31.1

CERTIFICATION

I, Tony J. Hunt, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Repligen Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 8, 2018

/s/ T ONY J. H UNT

Tony J. Hunt
President and Chief Executive Officer
(Principal executive officer)

Exhibit 31.2

CERTIFICATION

I, Jon Snodgres, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Repligen Corporation;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: May 8, 2018

/s/ J ON S NODGRES

Jon Snodgres
Chief Financial Officer
(Principal financial officer)

Exhibit 32.1*

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report of Repligen Corporation (the "Company") on Form 10-Q for the period ending March 31, 2018 as filed with the Securities and Exchange Commission on the date hereof (the "Report"), the undersigned officers of the Company hereby certify, pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, to my knowledge, that:

(1) The Report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: May 8, 2018 By: /S/ TONY J. HUNT

Tony J. Hunt
Chief Executive Officer and President
(Principal executive officer)

Date: May 8, 2018 By: /S/ JON S NODGRES

Jon Snodgres
Chief Financial Officer
(Principal financial officer)

* This certification shall not be deemed "filed" for purposes of Section 18 of the Securities Exchange Act of 1934, or otherwise subject to the liability of that section, nor shall it be deemed to be incorporated by reference into any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934.